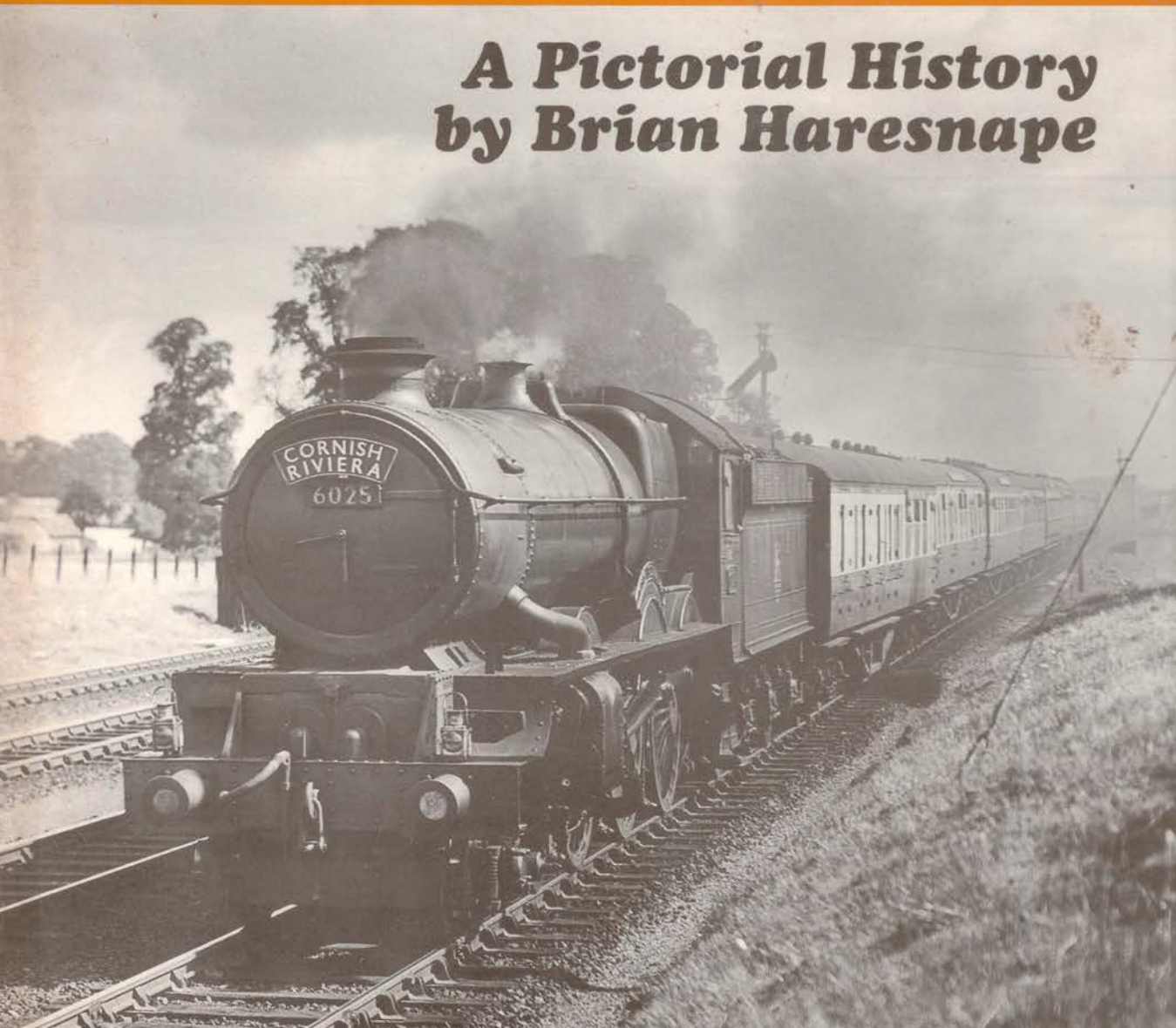
Collett & Hawksworth Locomotives

A Pictorial History
by Brian Haresnape



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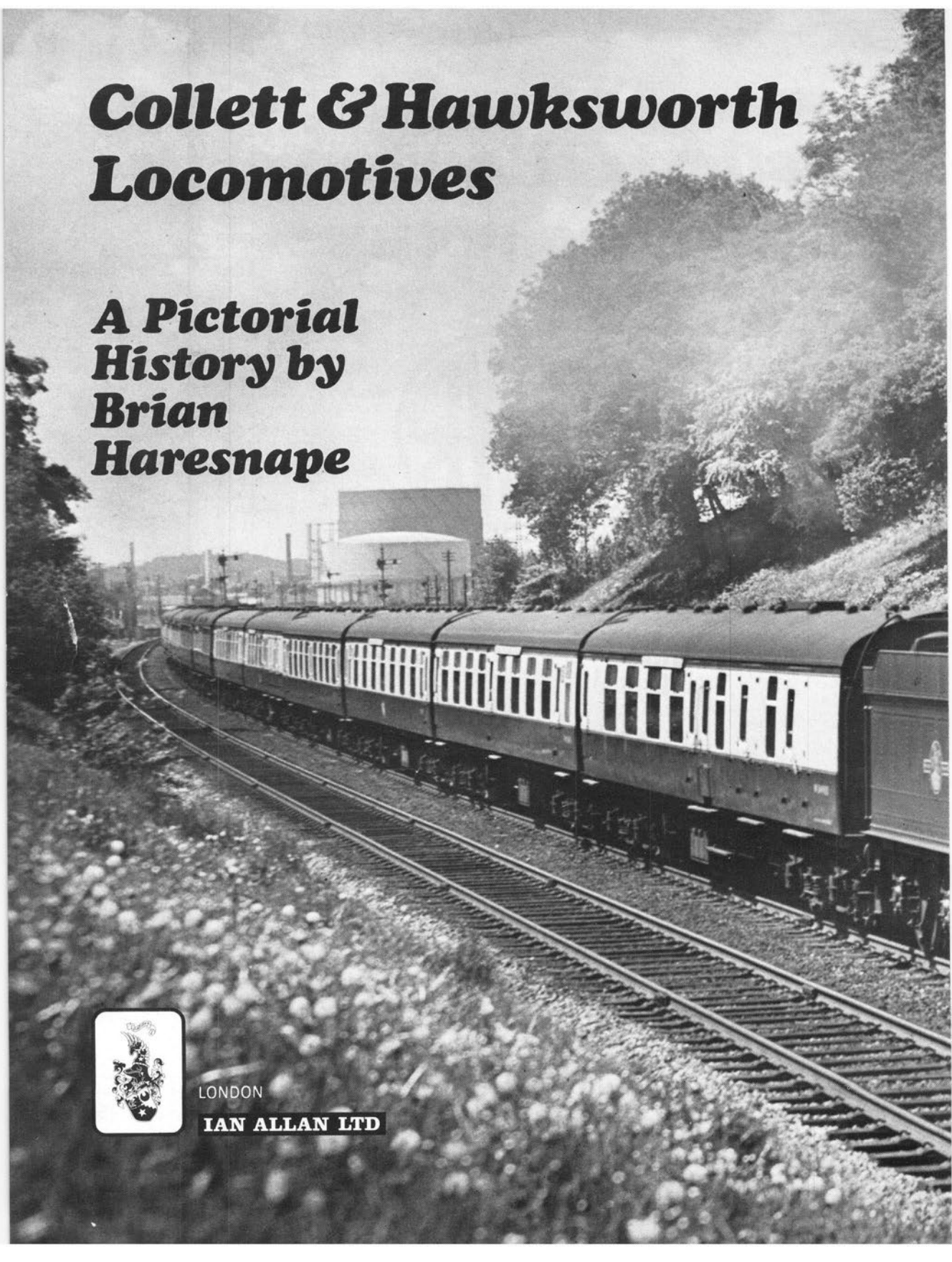

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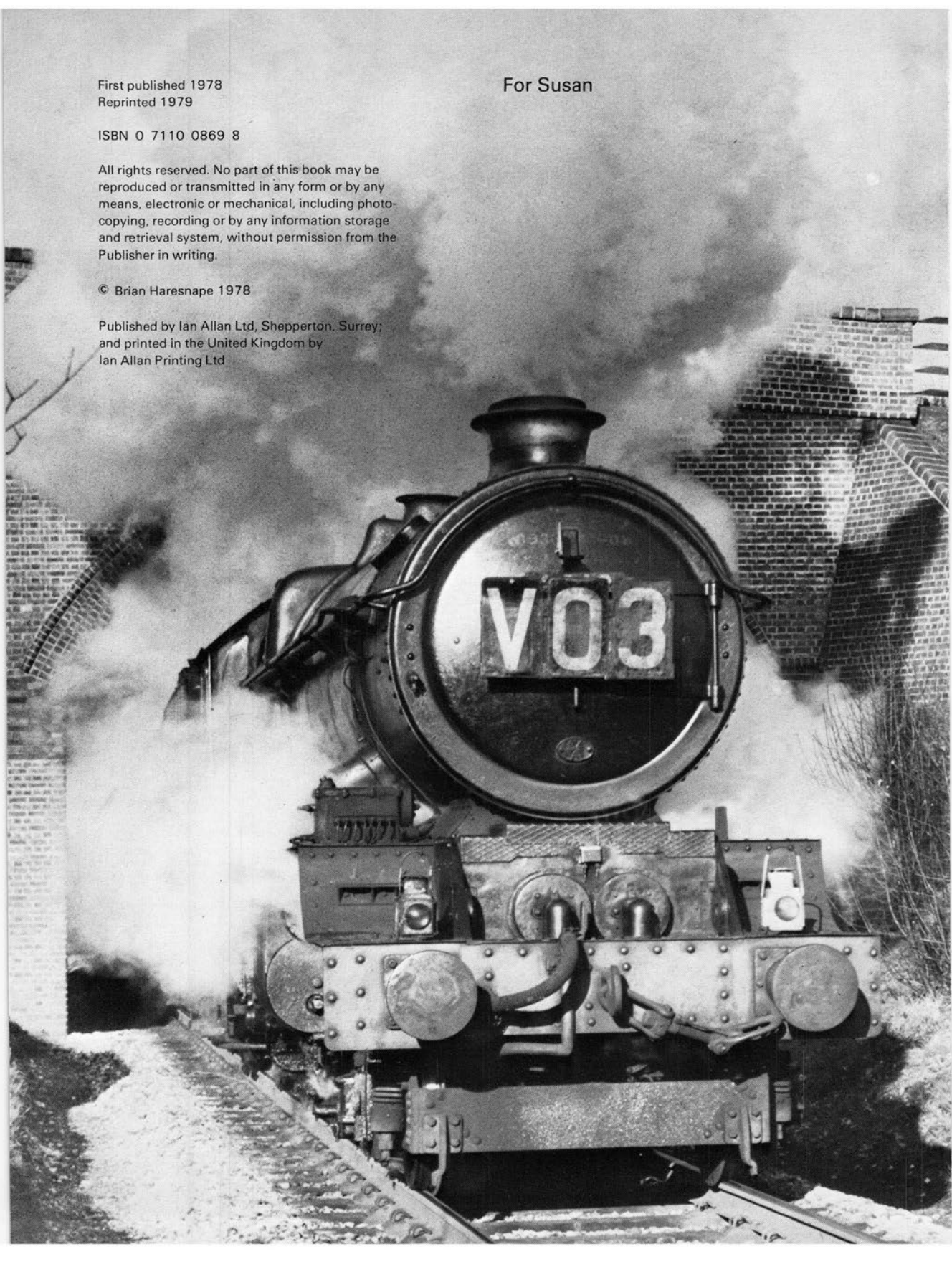

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Title page: 'King' class 4-6-0 No 6021 *King Richard II,* at the head of the up 'Mayflower' express in Sonning Cutting. The engine is in the final form of the class, with double blast pipe and chimney and high degree superheated boiler, as developed by Swindon in the late 1950s, and which gave these splendid machines a new lease of life./*M. W. Earley*

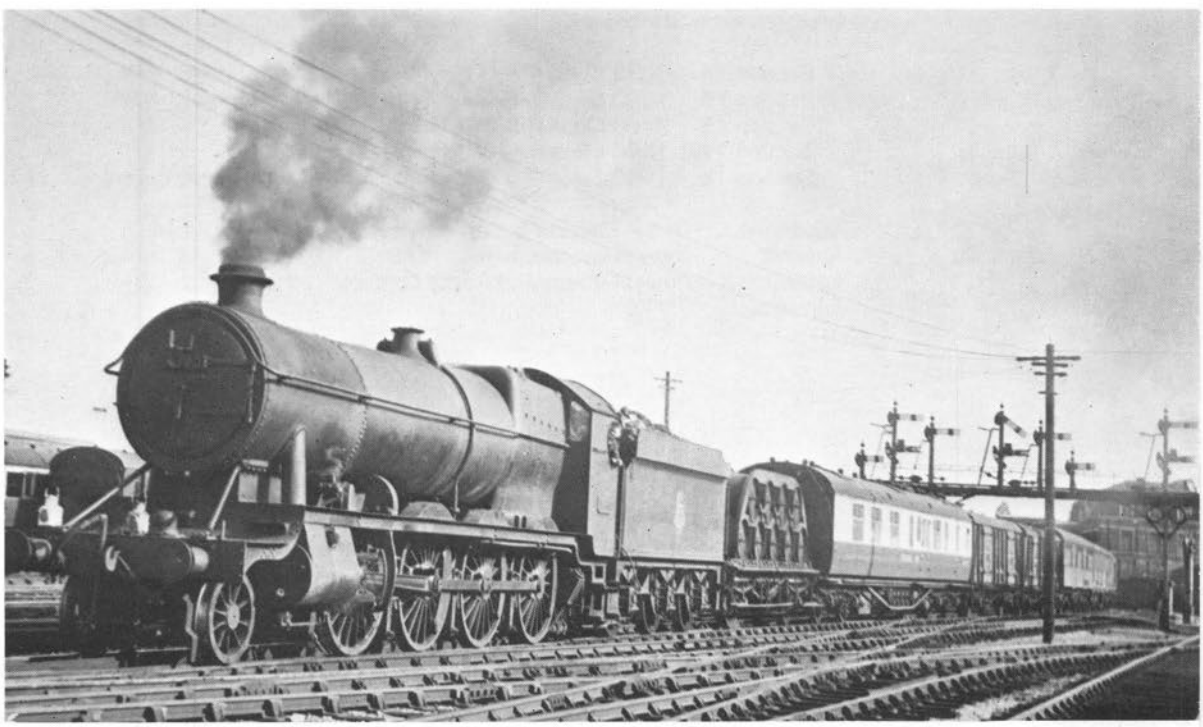
Left: Double-chimney 'King' class 4-6-0 No 6013 *King Henry VIII* storms under a road bridge near Saunderton summit on 13 January 1962, in charge of the 7.30am Birkenhead-Paddington express./*Bryan S. Jennings*

Introduction

When C. B. Collett succeeded Churchward as Chief Mechanical Engineer of the Great Western Railway, on 1 January 1922, he took office at the beginning of a year of upheaval on Britain's railways. The numerous privately-owned standard gauge lines were being reconstituted in four main groups, under the terms of the Grouping of Railways Act, 1921. Compared to the other three new railway companies which emerged from this upheaval — the LMS, LNER and Southern — the Great Western was extremely fortunate, in that it did not lose its identity (being the major constituent) its independence, its marked individuality, or even its name. It was quite simply the old firm enlarged.

The locomotive affairs of the new company remained firmly centred upon Swindon, and thanks to the excellent policy of standardisation established by Churchward it was possible to continue construction of existing types with enlarged versions to meet new traffic demands, and so cope with the needs of the Traffic Department in a most satisfactory manner. Several hundred engines were added to GWR stock at the time of the Grouping, most of them from the former Welsh railways. One of Collett's early jobs was to make an assessment of these and to frame a policy for future maintenance and renewal; of which more anon.

The standard express passenger engine of the day was the Churchward four-cylinder 'Star' class and a final batch of these, the 'Abbeys', came out in 1922-23 after Churchward had retired. These 12 engines were something of a stop-gap measure, because although it was realised that an enlarged version was needed to meet new traffic conditions, a suitable design had not yet been prepared. Churchward had in 1919 proposed an enlarged 'Star', which would have been possible by taking the large standard No 7 boiler of his big 4700 class 2-8-0s and placing it upon the 'Star' chassis; but this would have brought the axle load above the limit acceptable to the Civil Engineer. And so it



was Collett who produced the first new express passenger design for 12 years, when he planned the 'Castle' class in 1923 — a compromise version of Churchward's enlarged 'Star', with a boiler of acceptable size and weight. The performance of the 'Castles' quickly established Collett's reputation as a designer, but it must be observed in all fairness that both the 'Castles' and the later 'Kings' were direct derivatives of Churchward's standard practice. Likewise, by taking the standard two-cylinder 4-6-0 'Saint' class and fitting smaller coupled wheels, Collett produced the highly versatile and successful mixed-traffic 'Hall' 4-6-0. In each case he added refinements such as screw reverse, large side-window cabs and other details which improved upon the existing Swindon standard practice.

The eleventh engine of the 'Castle' class to appear was the subject of some controversy, because it was a rebuild of the famous Churchward Pacific No 111 *The Great Bear,* and this was apparently undertaken by Collett without the full awareness of the GWR Directors. The Pacific was something of a prestige symbol on the GWR, having been the first of her kind in Britain, and Collett was taken to task for his actions. The facts were that No 111 was in need of expensive repairs, and because of her excessive length and weight, was very restricted in her sphere of operation. Collett had produced a new standard express passenger design and intended to build it in sufficient quantity to meet foreseeable traffic needs, and so it was

Below left: Churchward's final locomotive design, the 4700 class 2-8-0 of 1919, carried his big new standard No 7 boiler. He envisaged this boiler being used on enlarged versions of his 'Star' and 'Saint' class 4-6-0s and his 2800 class 2-8-0, but the Civil Engineer refused to accept his projected designs due to excessive engine weight. No 4703 was photographed leaving Newton Abbot, with the up 4.25pm Plymouth (Millbay) to Paddington parcels train on 8 July 1955./*C. H. S. Owen*

Below: Collett created quite a stir in high places at Paddington when he withdrew Churchward's prestige 'Pacific' design, No 111 *The Great Bear,* and rebuilt it as a smaller 4-6-0, to his 'Castle' class specification. The engine retained the same number, but was renamed *Viscount Churchill.* It was an early candidate for class withdrawal (July 1953) and certainly looked to be in a run-down state when this photograph was taken, as it headed the down 'Cornish Riviera' near St Erth on 31 August 1951./*B. A. Butt*

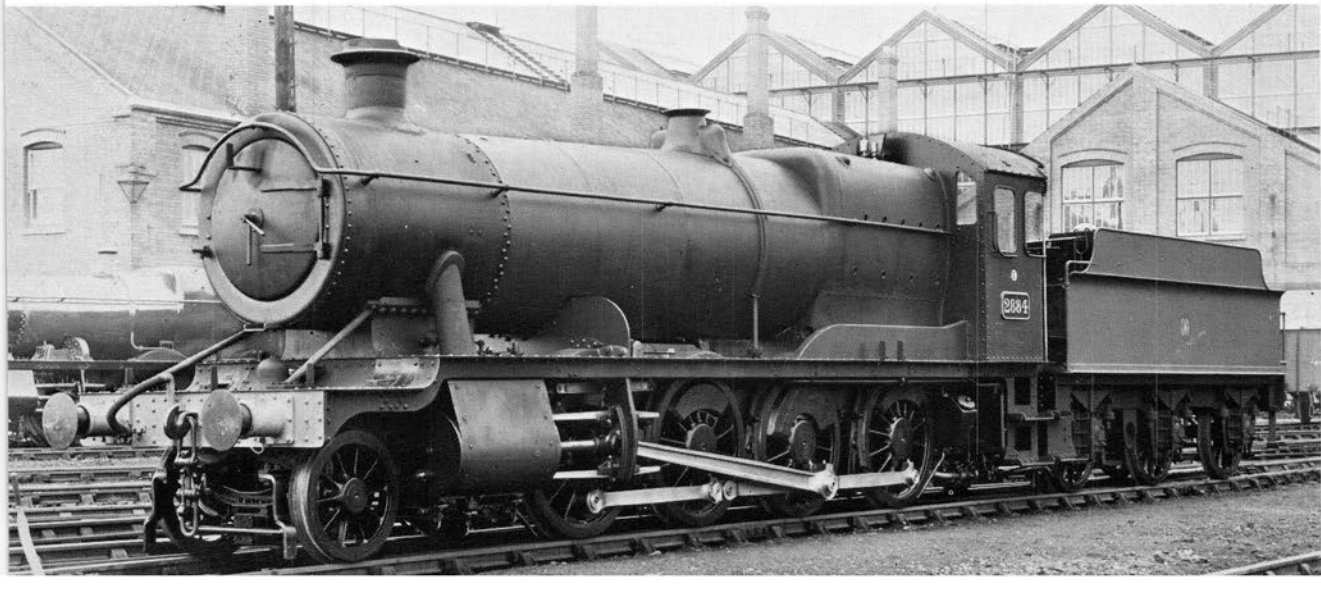
an obvious step to bring this 'one-off' and difficult-to-roster Pacific into line by rebuilding it. A side effect of this episode was to bring the problems of axle-load restrictions to the attention of the General Manager. When new 'super-power' was required, some three years later, Sir Felix Pole took the matter firmly in hand and instructed the Civil Engineer to have certain routes strengthened to receive a 22½ton axle-load, at the same time instructing Collett to proceed with the design of the 'Kings'.

Construction of standard Churchward designs was continued by Collett, with batches of 2-6-2Ts, 2-8-0Ts, 2-6-0s and 2-8-0s*, and increasing use was made of outside locomotive builders; later on large batches of tank-engines were supplied by them, also some 2-6-0s. For the motley collection of absorbed engines, mostly of Welsh origin, mentioned earlier, Collett decided upon a policy of scrapping the worst in due course, and reboilering and overhauling the rest up to GWR standards, to give them a further lease of life. Wherever possible, standard Churchward boilers and fittings were used, which proved most successful in achieving a satisfactory degree of interchangeability for engines which previously had little in common except their wheel arrangements.

Admirable though Churchward's standard policy undoubtedly was, Collett was flexible enough in his views to be able to depart from it, when conditions were such that an alternative was more suitable. An early example of this was the requirement for a large number of replacements of obsolete Welsh engines. The Churchward standard 2-6-2Ts, or perhaps another outside-cylinder variant using standard parts, would have been preferred in all probability, but Collett wisely listened to the results of an investigation which clearly showed that an inside-cylinder type would be more versatile. Most of the engines to be replaced were of the 0-6-2T type, and it was therefore logical to replace like for like. As a result, the 5600 class 0-6-2T was designed, with non-standard coupled wheels of 4ft 7½in, but with as many standard parts as possible, including the boiler. Other examples of engines produced for specific needs included further tanks for the 1ft 11½in gauge Vale of Rheidol (still in service at the time of writing), and the 1101 class 0-4-0T dock shunting engines,of Avonside Engine Co design, modified to Collett's specification.

Collett's masterpiece, the 'King' class four-cylinder 4-6-0 of 1927, was the logical enlargement of the 'Star' which became possible once the axle load had been raised to 22½tons. Although the 'Castle' class were fine engines, a need existed for even bigger express passenger power for West of England and Birmingham services, where train loads were steadily increasing. All the familiar Churchward features were incorporated, and yet the wheels, cylinders, frames, boiler and bogies were all of non-standard design, to meet the demand for increased power within the four-cylinder 4-6-0 specification. Although Churchward had retired some seven years earlier, he still lived in his house opposite

**The Churchward standard designs constructed after his retirement, by Collett and Hawksworth, are described in the companion volume,* Churchward Locomotives, *by Brian Haresnape & Alec Swain, published by Ian Allan Ltd.*



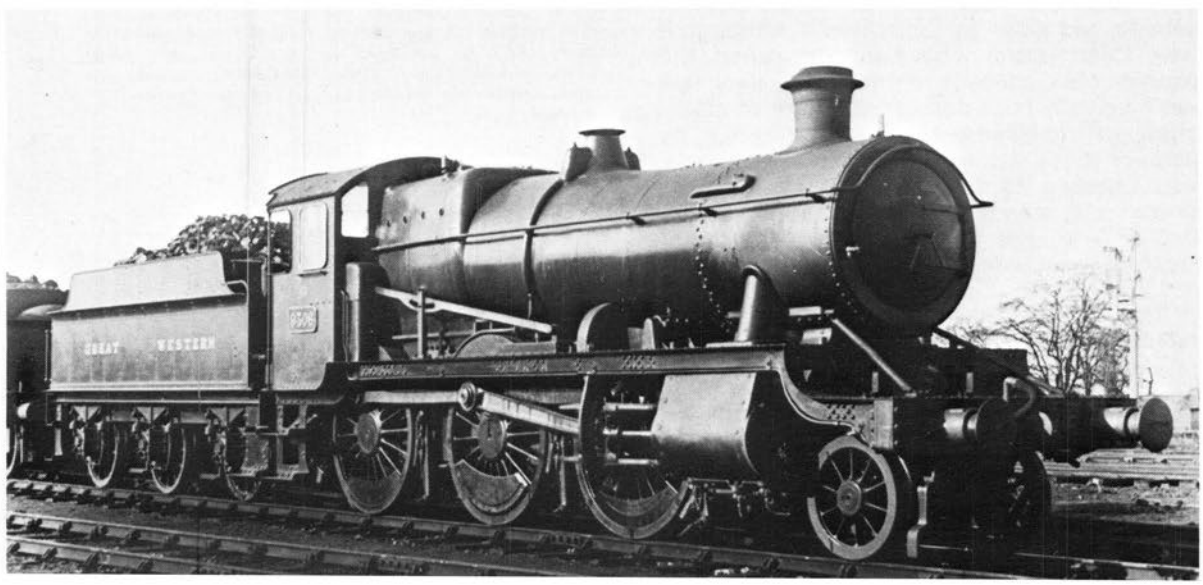
Below left: The excellent standard 2-8-0 heavy freight engine designed by Churchward in 1903, the 2800 class, was perpetuated in only slightly altered form by C. B. Collett, when he introduced No 2884 in 1938, some 20 years after the first appearance of the design. Nos 2884-2899 and 3800-3866 were built between 1938-1942. Modifications included a side-window cab; outside steam pipes to the cylinders, short safety valve bonnets and a long fire-iron casing above the footplate on the left-hand side of the engine. First of the Collett engines, No 2884, was photographed outside Swindon Works in matt paint finish, when newly constructed./*British Rail WR*

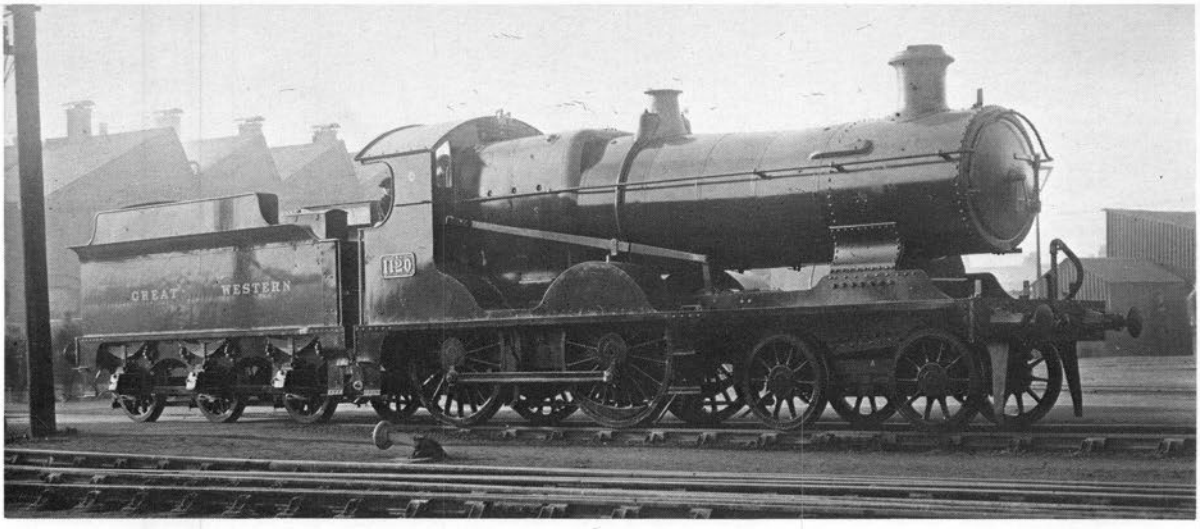
Above: Collett developed the standard Churchward 2-6-2T design, improving upon the original 3100 series and also introducing a new series for the London area suburban services, in 1931-35. This was the highly successful 6100 class, which lasted until the BR diesel railcars were introduced. No 6106 was photographed at Southall, in BR days, with footsteps added to the bunker side. Engines of the 5101 series (up-dated version of the 3100) were constructed during Hawksworth's tenure of office at Swindon, with the last batch, Nos 4160-4179 appearing as late as 1948-9, under BR auspices./*Alec Swain*

Below: Only 20 improved engines of the Churchward standard 2-6-0 design were introduced by Collett, in 1932, as there was pressure from the traffic people to have a lightweight 4-6-0 design instead. Subsequently 100 Moguls were withdrawn for rebuilding as 80 'Grange' class and 20 'Manor' class, in 1936-39; then the outbreak of war curtailed the scheme to rebuild the rest. The Collett Moguls had improved side-window cabs, screw-reverse, outside steam pipes, and were at first confined to Red routes because they weighed 65tons 6cwt in working order; later they were lightened to Blue route restriction, and renumbered from 9300-9319 to Nos 7322-7341, in sequence. No 9306 is illustrated in pre-war livery./*Collection: Author*

Swindon Works, and took an interest in locomotive progress. One can imagine the interest he must have taken in the appearance from the shops of the 'King' class design, which required considerable skill on the part of the draughtsmen involved.

No 6000 *King George V* furthered the prestige of the GWR in no uncertain terms, and the big engine positively sparkled in the





limelight of publicity which surrounded it. The GWR was an extremely publicity-conscious railway and produced lavish booklets and guides for 'boys of all ages', with exhaustive details of their engines, famous trains and exploits. Titles such as *Loco's of the Royal Road, The 10.30 Limited, Caerphilly Castle,* and *Cheltenham Flyer* were excellent value for money and did much to bring the railway's activities to the attention of the public. Besides which, the readily observable excellence of Great Western engines in day-to-day running with main line trains, plus the esprit de corps of the staff, fully justified such publicity, which all contributed to the superiority complex that surrounded all things Swindon!

One area of locomotive operation which figured largely in GWR affairs was the role of the humble shunting engine and light passenger and freight 0-6-0T. Literally hundreds of these tanks were included in the GWR stock book when Collett took over, but they were not part of the standardisation scheme laid down by Churchward. Although it was Churchward who had introduced the pannier tank concept to the GWR, very few were actually built during his tenure of office, although replacement of saddle tanks by pannier tanks, on existing Victorian engines, was pursued as a policy from about 1912 onwards. It was left to Collett to include the 0-6-0PT in the range of standard GWR locomotives, commencing with his 5700 class of 1929.

This marked the commencement of a remarkable period, 1930-34, when Collett revived designs of some 50 or 60 years earlier, improved and up-dated them, and used them

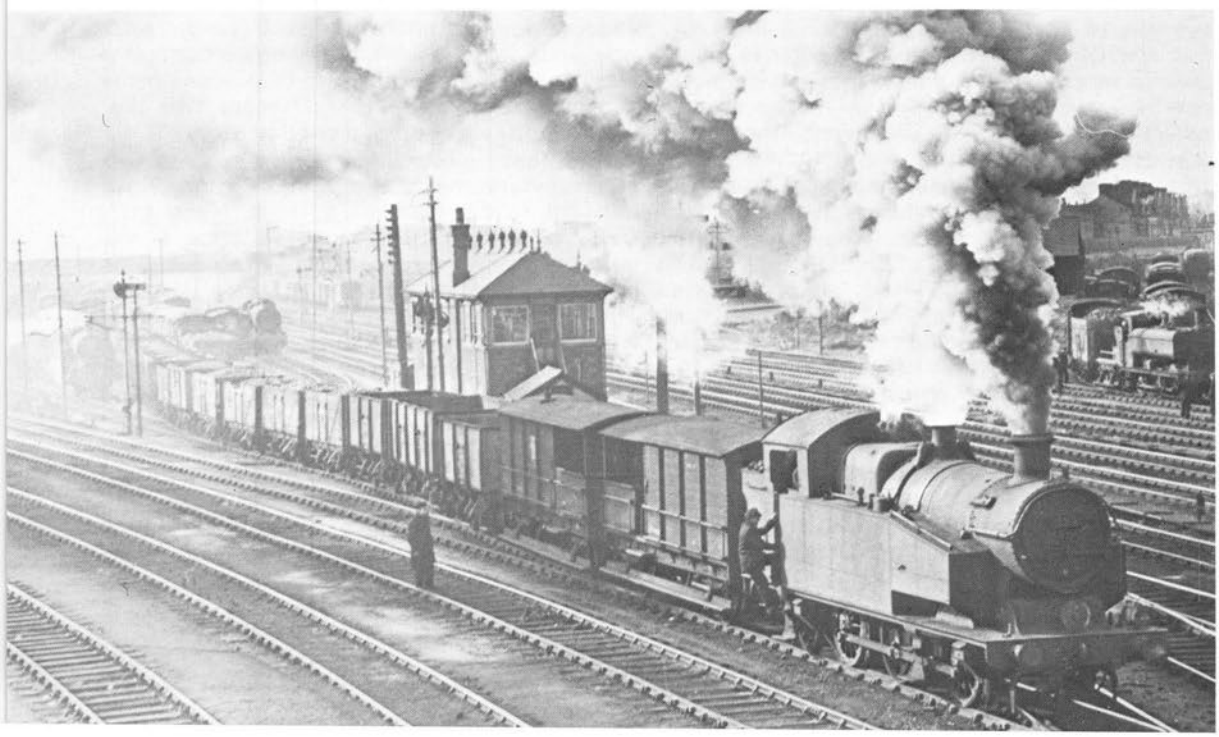
Above: At the Grouping the Great Western Railway absorbed a number of smaller undertakings, including several Welsh railways and the Midland & South Western Junction Railway. Swindon was presented with a motley collection of engines, some in deplorable condition, and Collett set about improving those worth saving — a process sometimes referred to as "Swindonisation". By replacing existing boilers with new GWR standard boiler types, improving the cabs and cab fittings and modifying the tenders, many engines were given a further useful lease of life. Former MSWJR 4-4-0 No 2, now GWR No 1120 is seen here just after receiving the Swindon treatment./*LPC*

Above right: The Welsh railways absorbed by the GWR relied heavily upon tank engines, and in particular upon the 0-6-2T wheel arrangement. The Rhymney, Taff Vale and Barry Railways all used the type for the coal traffic, and for passenger trains. In an effort to improve the varied 0-6-2T designs which were taken over, Collett decided upon a policy of overhauling those worthwhile saving from the scrapheap and, where possible, reboilering them to Swindon standards. Modifications were also made to cabs, cab-fittings and bunkers in many cases. Two former Rhymney Railway 0-6-2Ts, Nos 79 and 81 on the GWR stocklist, originally Nos 36 and 38, built to H. Riches's design for the Rhymney Railway in 1921, are seen here in BR livery on passenger turns, at Rhymney station on 1 August 1953./*W. Potter*

Right: Former Cardiff Railway 0-6-2T, No 35 of 1908, rebuilt by Collett in 1928 and numbered 155 in the GWR stocklist still at work in BR days and seen here shunting at Pengam sidings in February 1953. So successful was the 0-6-2T, with inside cylinders, for duties in South Wales, that Collett produced a new standard version, the 5600 class, in 1924 (see Section 3.) /*S. Rickard*

to replace life-expired existing types. Included were several variants of the 0-6-0PT, for auto-train duties and light passenger work, and a most attractive 0-4-2T directly based upon George Armstrong's 517 class, as modified with outside bearings for the trailing wheels, and known as the 4800 [later 1400] and 5800 class. So prolific were these new smaller standard types to become that one class, the 5700 0-6-0PT, was the most numerous class of engine on the GWR, with over 850 built by 1950. Another example of Collett's appreciation of the soundness of design of some locomotives dating back to earlier times, was his retention of sufficient 'Dean Goods' 0-6-0s, with improved boilers, to operate over routes with severe axle load restrictions, where his own 2251 class could not be used. He even went a stage further in 1936, by producing the 3200 (later 9000) class of 4-4-0s from an amalgam of parts of old 'Bulldog' and 'Duke' class engines, for use on the former Cambrian Railway lines.

In retrospect, it seems that Swindon began to lose its lead in British steam locomotive affairs in the mid 1930s, by which time Gresley on the LNER and Stanier (who had been Collett's principal assistant until 1932) on the LMS, were both developing new designs that were in advance of Churchward practice. In a sense this was true, but is must be remembered that Collett had stocked the GWR with sufficient new locomotives to meet the needs of the day, whereas Stanier, for

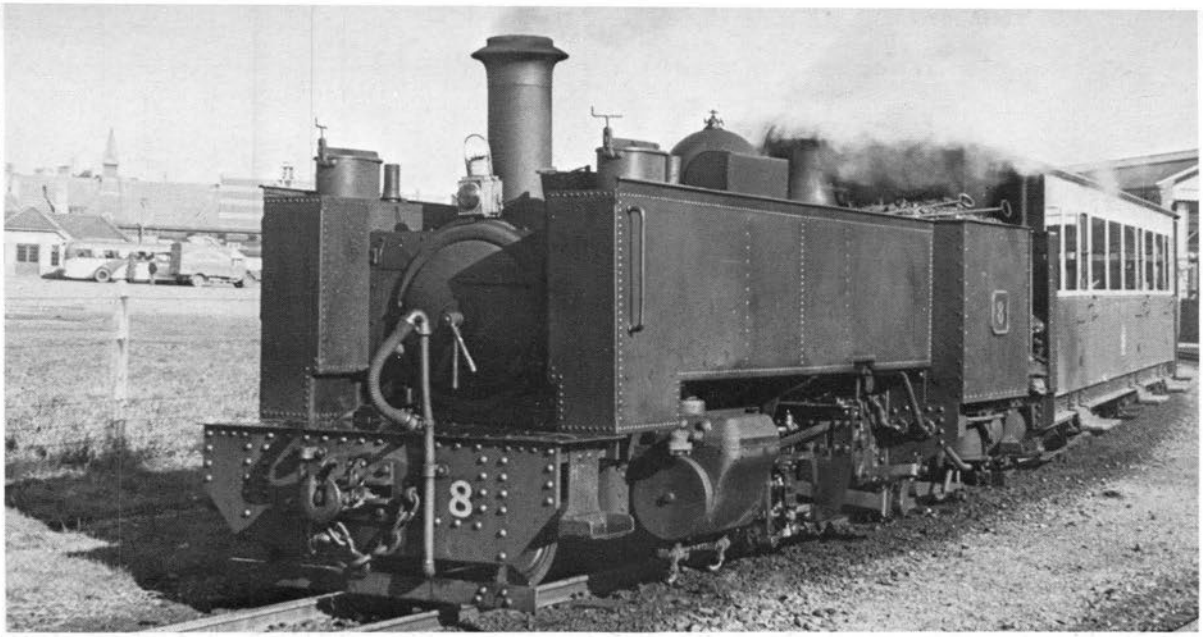


instance, was busy trying to put the LMS back on its feet. Where Collett perhaps went astray was in not taking sufficient notice of developments then taking place elsewhere, such as the work of Chapelon in France, and in persisting with hallowed Churchward features such as low-degree superheat. In any event, it was the dramatic change in 1939, when World War II broke out, that ended the rarified atmosphere of Swindon activities; but this took place when Collett was close to retirement and it was left to his successor, F. W. Hawksworth, to cope with the new problems that arose. One field of development in which Collett clearly led the way in the 1930s was the use of diesel railcars, and the GWR had some excellent streamlined cars in service at the time of his retirement, in June 1941.

F. W. Hawksworth had a lifelong association with Swindon and had been Chief Draughtsman and Technical Assistant to Collett, before he took office as CME in 1941. He found himself faced with very different conditions to those which Collett had enjoyed for some 20 or so years previously, with Britain in the midst of war and Swindon policy controlled by the Mechanical Engineers' Committee of the Railway Executive. In Collett's last years, Swindon had been building 'Castles', 'Granges', 'Manors', 2-8-0s, 2-6-2Ts and 0-6-0PTs. The wartime Railway Executive cancelled several orders for these engines, and new construction was concentrated upon freight and mixed-traffic types, including a quantity of Stanier LMS Class 8F 2-8-0s for the War Department. Some old engines were given a reprieve and put back into service after overhaul, such was the need for motive power whilst new development work was almost at a standstill. It was not until 1944 that Hawksworth produced evidence of the way his mind had been shaping the motive power for post-war needs, when he began the construction of a series of Collett 'Hall' class 4-6-0s, to which he had made certain modifications. These engines, known as the 6959 class, or 'Modified Hall', had larger superheaters, a new design of frames, cylinders and bogies, and a total of 71 were built up to 1950. The only large new Hawksworth design proper, appeared in August 1945 and could be described as an enlarged 'Saint' class engine, but with a number of new features, including a boiler pressure of 280lb, coupled wheels of non-standard 6ft 3in diameter, and a new type of straight-sided tender. The new boiler had certain features in common with the Stanier boiler used on the 8Fs built at Swindon during the war. This new 4-6-0, the 1000 class (later known as the 'County' class), was practically equal to the four-cylinder 'Castle' class in terms of weight and power, but being a two-cylinder engine it was cheaper to construct and maintain. Only 30 were built and they had a mixed reception.

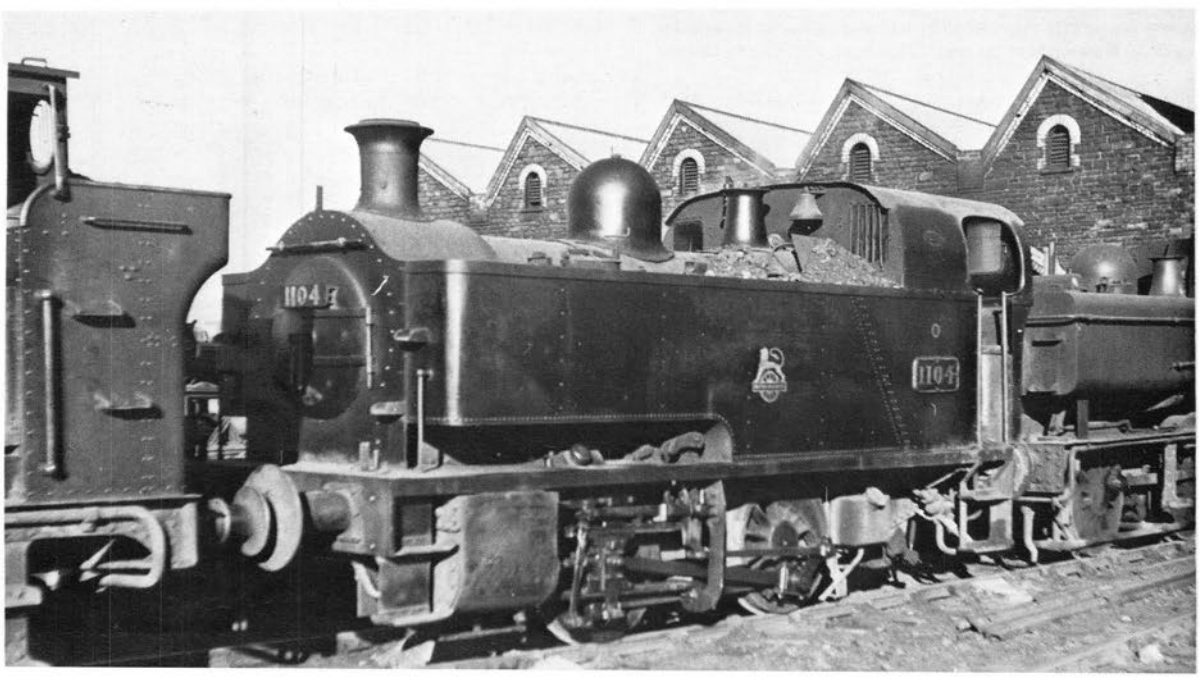
Hawksworth was well aware of the changed conditions the GWR faced after the war was over, with poor and often unpredictable quality fuel, shortage of shed staff and reliable labour generally, and common-user operation of sophisticated multi-cylinder engines. He progressed towards high-degree superheating and greater emphasis on servicing and accessibility of working parts, but the onset of nationalisation brought new locomotive development work to a halt at Swindon, except for some further pannier tank designs. Hawksworth retired at the end of 1949 without really having had an opportunity to establish his ideals in practice to any great extent. One notable contibution he made was the introduction of an entirely new form of railway motive power to this country, when he ordered a main-line gas turbine locomotive from Switzerland, for trials on the GWR. This engine, No 18000, and a second one of different design, No 18100, did not commence running until after his retirement. Results in service were quite encouraging, but no further development work was undertaken by BR, and when steam gave way to more modern forms of power on the Western, it was the diesel locomotive that won the day — but that's another story!

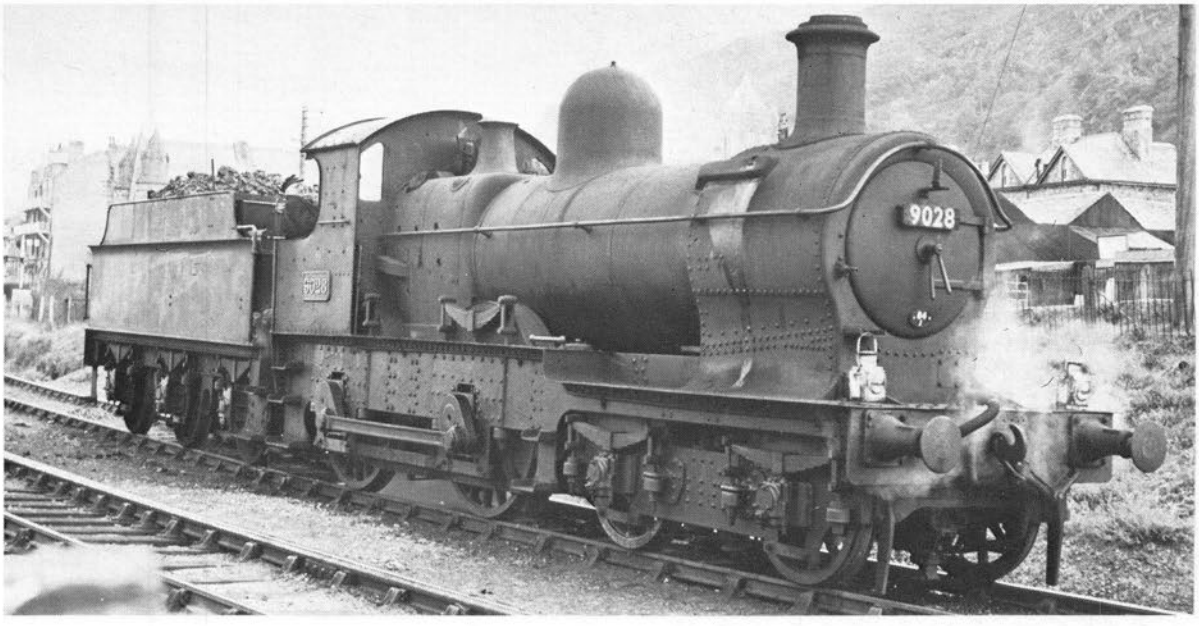
The final chapter in the long history of GW steam locomotive tradition and design which remains to be mentioned, took place from 1953 onwards, after the introduction of the new BR standard designs, in which Swindon had played an important part along with the other major drawing offices and works. This was the important work done on re-draughting the Collett and Hawksworth express passenger and mixed-traffic 4-6-0s, undertaken by S. O. Ell and his team at Swindon. Ell improved the steam raising abilities of the excellent Swindon standard boilers when faced with inferior coal quite dramatically, and when he worked out a double blastpipe layout together with high-



Above: The absorption of the Cambrian Railway brought the 1ft 11¼in gauge Vale of Rheidol line under GWR control, and Collett was soon asked to provide two new narrow gauge locomotives for the line, which runs from Aberystwyth to the Devil's Bridge. For obvious reasons, these new engines could not conform to GWR standard design, but it did prove possible to use the standard cylinders of the Rail Motor vehicles, which Churchward had introduced, with outside Walschaerts valve gear. Roughly every four years they would be transported to Swindon for overhaul, and by an odd stroke of fate they have survived (up to the time of writing: January 1977) as the only steam locomotives still in active revenue-earning service on British Rail's stockbook! Together with the original engine of 1902 Davies & Metcalfe design, No 1213, later No 9 *Prince of Wales* (as rebuilt by Collett) Nos 7 and 8 (named *Owain Glyndŵr* and *Llywelyn* respectively) still operate in much their original form. No 8 was photographed at Aberystwyth on 26 August 1948. The engines received names in 1956./*H. C. Casserley*

Below: The small series of 0-4-0T Dock Shunting Engines, Nos 1101-1106 introduced in 1926, were not a standard GWR design, but were of the Avonside Engine Co's design to Collett's specification. They were specifically intended to replace old 0-4-0Ts taken over from the Swansea Harbour Trust. When new the top of the cab was square to the roof gutter line, but Collett rounded this off to improve loading gauge clearance in the docks, and he also placed a GWR safety valve bonnet over the firebox. 1101 class 0-4-0T No 1104 was photographed at Danygraig on 22 February 1959. Note the bell attached to the cab front./*M. G. Martin*

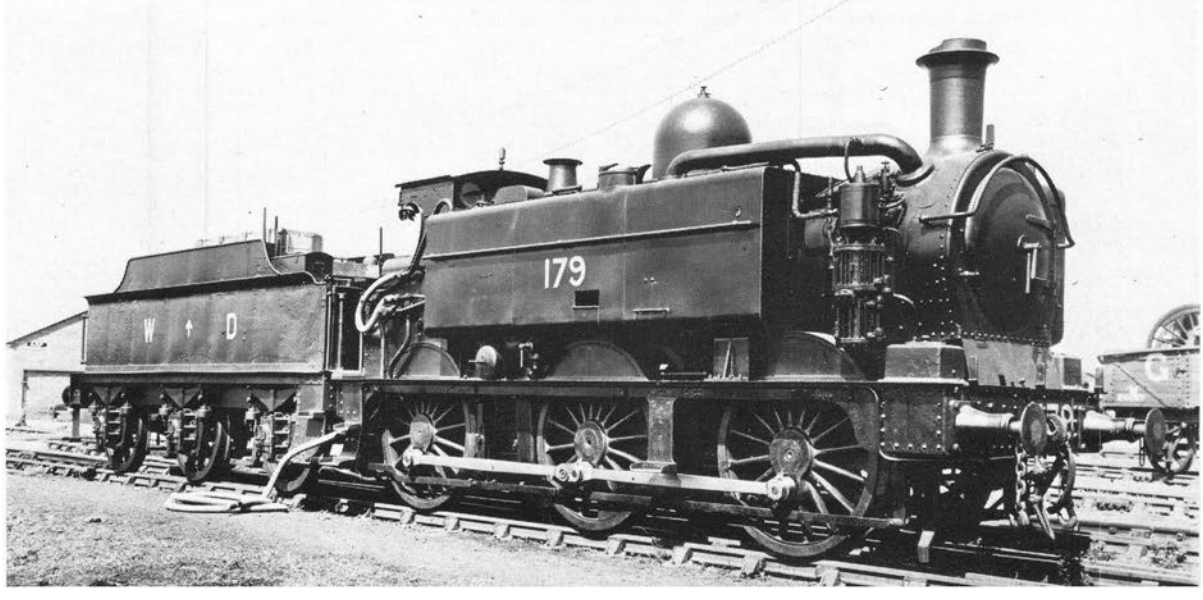




Above: An ingenious example of Collett's policy of modernising older engines, wherever possible, was the production of the 3200 (later 9000) class of 4-4-0s in 1936. Originally known as the 'Earl' class, they were in fact an amalgam of existing parts, and cannot really be classified as a 'new' design. He took the frames from 'Bulldog' class 4-4-0s and mounted standard 'Duke' class boilers on them, thereby producing 30 double-framed 4-4-0s to replace the 'Dukes' on light passenger traffic over former Cambrian Railway lines — a 'new' late-Victorian engine produced in 1936! No 9028 of this popular class (which lasted for more than 20 years) was photographed at Barmouth on 9 June 1956./*P. H. Wells*

Below: When the Ministry of Transport announced that it would need locomotives for war service overseas, in July 1939, an early solution was found in the requisition of 100 of the rugged 2301 class 0-6-0s, dating in design from 1882 — the 'Dean Goods'. Collett had suitable engines taken to Swindon for overhaul (20 were sent to Eastleigh) and some received pannier tanks and condensing apparatus, also air brakes. Their light axle load, simplicity and reliability had caused them to be used during World War I on similar duties, and Collett selected them again, in preference to his own 2251 class, which had a heavier axle-load. No WD179 was photographed at Swindon, ready for war use./*British Rail WR*

Above right: Collett recognised the potential of the diesel railcar for branch line and lightly loaded main line traffic. He developed the original AEC design to suit Great Western needs, and produced some attractive streamlined cars, although the final series, built at Swindon had a very angular look. After 3 years of experience with cars Nos 1-17, Collett produced car No 18, in which the important new feature was an ability to haul a 60ton tail load, and this car together with subsequent ones had standard buffers and drawgear fitted. The car is seen, when new, running trials near Southall, on 5 February 1937, with a standard GWR auto-trailer in tow behind./*Ian Allan Library*



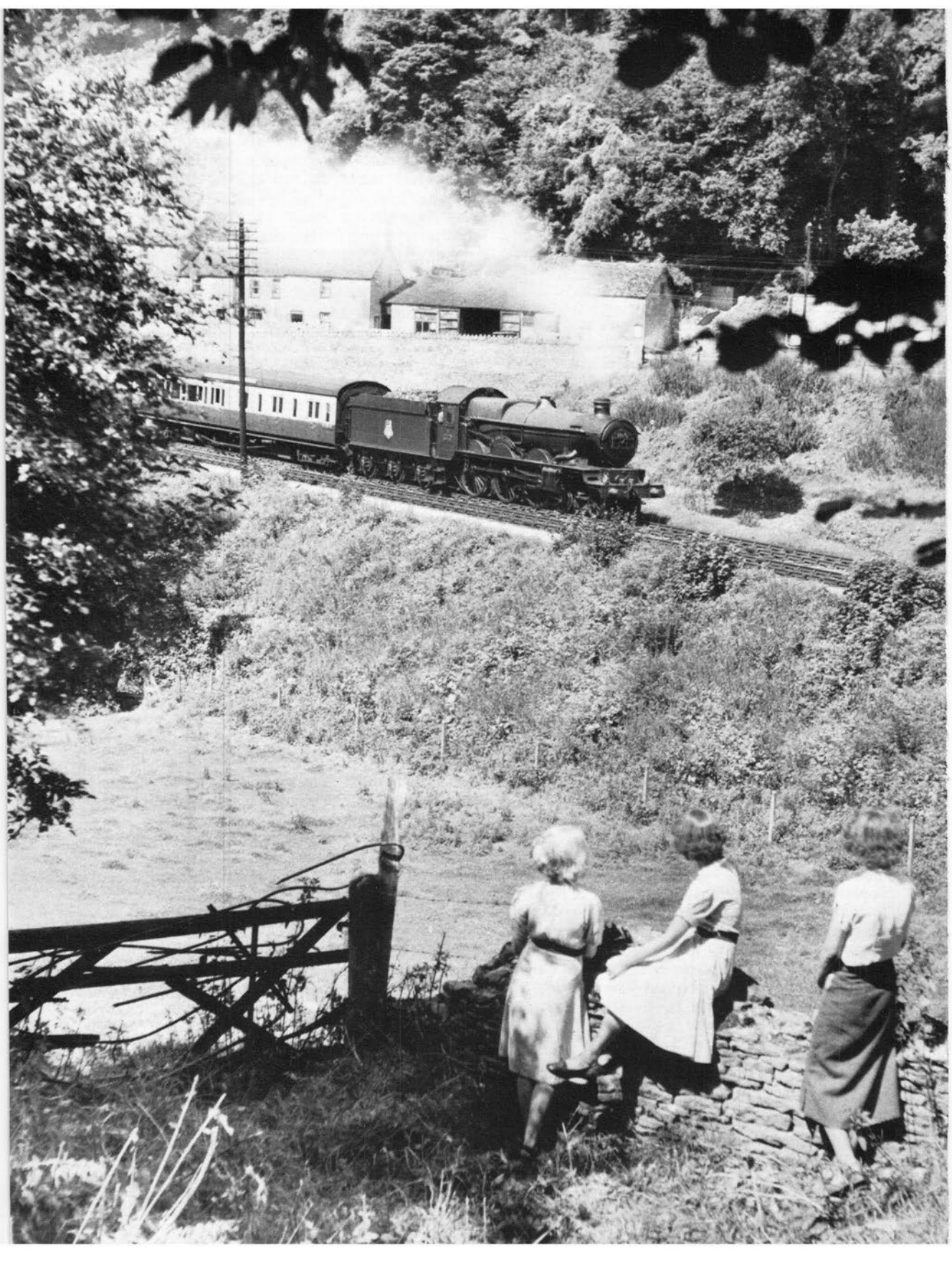
degree superheat for the 'Kings' and 'Castles' he put new life into these fine locomotives for their final years of running, before they were made redundant by the modernisation plan diesels. To the end they matched the very best of pre-war standards of performance, and restored Swindon steam to pre-eminence on British rails.

In recent years the entire locomotive history of the Great Western Railway has been magnificently chronicled by the Railway Correspondence & Travel Society, in 12 parts (see Bibliography, page 128) and the reader in search of very detailed information is referred to this source. The object of this present work, a companion volume to my *Churchward Locomotives,* already published, is to present in pictorial format the general story of Collett and Hawksworth locomotives. I do not attempt to enter into exhaustive technical detail, or to include details of specific performances by locomotives. The emphasis is upon the visual, rather than the purely technical aspects of the locomotives produced by these two great engineers, and it will I hope be of particular value to modellers. I have seen many fine scale models which have errors in detailing, or confusion over numbering, and I hope the present work will assist in avoidance of such mistakes. Another aspect I do not dwell upon concerns accidents to locomotives in service, as I do not consider that these unfortunate tragedies tell any relevant story. The fascinating story of 'locomotives that might have been' has been fully covered in the classic RCTS history already mentioned, and I do not need to repeat it here except, out of interest, to mention that Collett had a project for a compound 'Castle' in 1926 and Hawksworth had two designs of some promise, one being a version of the 'County' class with outside Walschaerts valve gear, the other being a tentative proposal, in 1946, for a four-cylinder Pacific with a domed boiler, but retaining inside valve gear.

I hope that many fond memories will be revived by the illustrations I have selected and that at the same time a clearer picture of the development of each class, or type, will present itself to the reader. My own admiration for Great Western steam centres around the classic 4-6-0s, with their superb finish and striking lines, but I must admit to a weakness for those impudent little 0-4-2Ts that always seemed to be waiting in bay platforms along the line! At the last count no fewer than 61 Collett and Hawksworth locomotives were listed as preserved, or scheduled for preservation, and such a tribute to their popularity needs no further embellishment on my part; I would rather let this pictorial history speak for itself.

Many people have been kind enough to assist me whilst compiling this work — which has been a most enjoyable task — and in particular I wish to place on record my sincere thanks to: H. C. Casserley, K. J. Cook, R. O. Coffin, A. B. MacLeod, P. Rowledge and Alec Swain. Once again, the valuable services of the Ian Allan Library are gratefully acknowledged, also those of the Public Relations Office of the Western Region, BR. The line drawings are reproduced by courtesy of the *Railway Gazette* and Ian Allan Ltd. Without the splendid efforts of all the photographers whose work appears in this book, my work would have been in vain; to all of them my very sincere thanks.

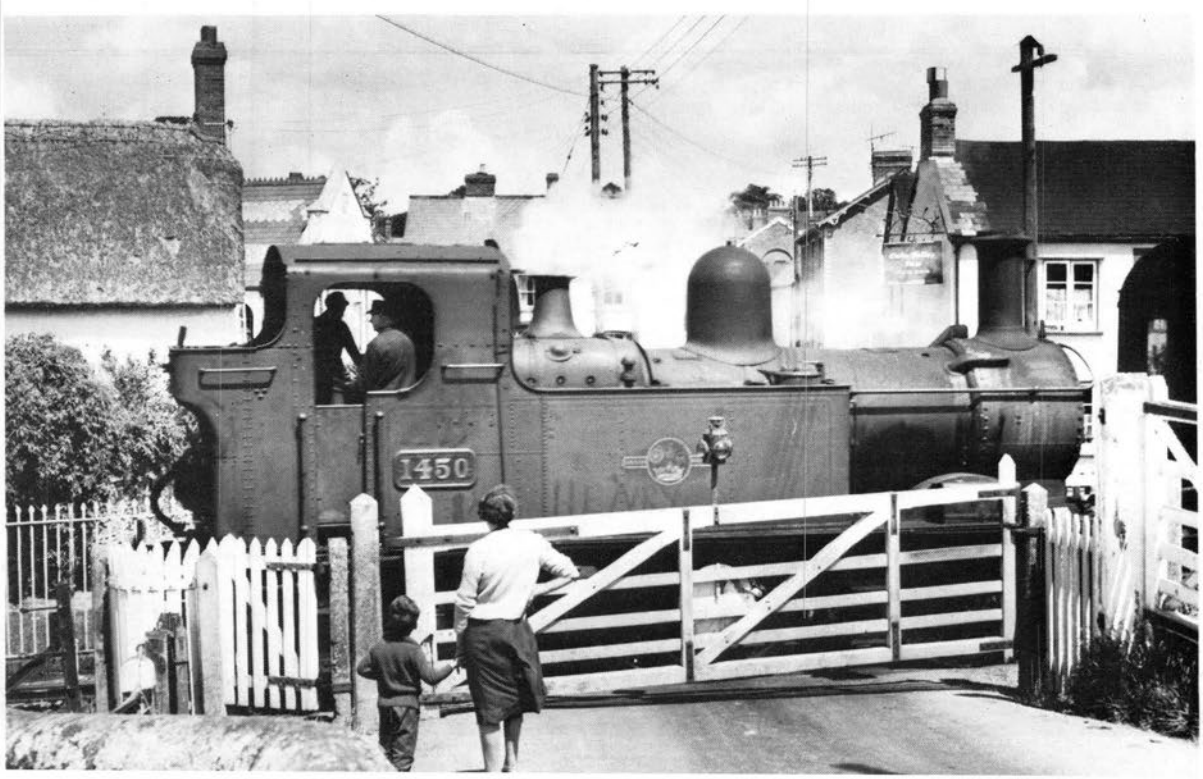
Brian Haresnape FRSA NDD
Box Hill, Surrey
March 1977



Left: The magic appeal of Great Western steam: 'Castle' class 4-6-0 No 5018 *St Mawes Castle* attracts three young admirers as it climbs Sapperton Bank with the 1.30pm Cheltenham-Paddington express on 3 August 1953./*G. F. Heiron*

Above: More admiring glances, this time for Hawksworth 'County' class 4-6-0 No 1007 *County of Brecknock,* in clean lined-black livery, at the head of a down Paddington-Bristol express. Photographed on the outskirts of Bath on 4 September 1951./*Pursey C. Short*

Below: A vanished joy of boyhood days, when even a Collett 0-4-2T seemed an imposing, vibrant machine, viewed at such close-quarters! No 1450 leaves Culmstock with the 12.09pm Culmstock-Tiverton Junction train, on 22 June 1963. The engine is in the fully lined-out passenger green livery which Swindon re-introduced for the final years of steam, even for such humble engines as these./*M. J. Fox*



The Collett Era

C. B. Collett
Chief Mechanical Engineer, 1922-1941.

SECTION 1
4073 Class 4-6-0 4-cyl Express Passenger Engines
Introduced: 1923
Total: 179
GWR Classification: D, Red
BR Power Class: 7P*
'Castle'

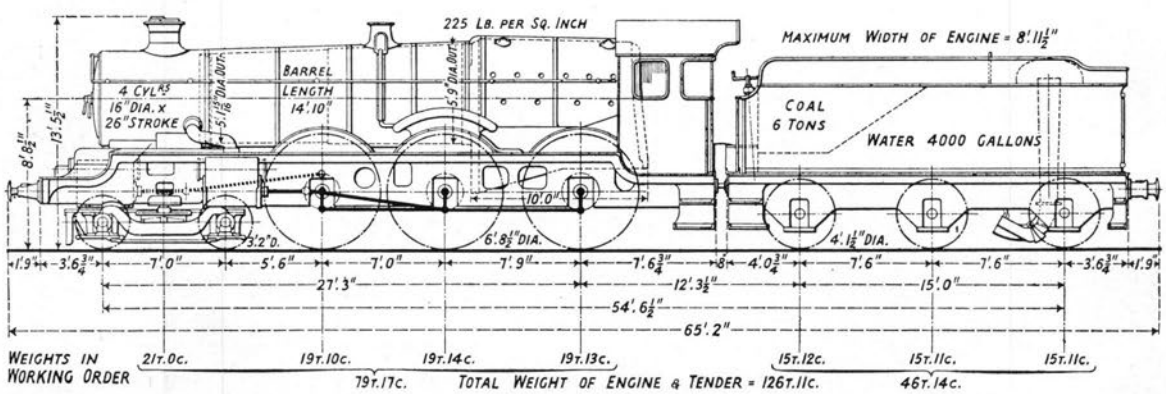
Charles B. Collett succeeded G. J. Churchward as Chief Mechanical Engineer of the Great Western Railway on 1 January 1922. Collett had previously been Churchward's chief assistant, and he took office at the start of the year of transition, when the GWR was being reconstituted as one of the Big Four railway groups, under the Grouping of Railways Act, 1921. Although the locomotives of a number of smaller lines had to be absorbed (and in some cases quickly withdrawn), the standardisation policy for locomotives, introduced by Churchward, was sufficiently advanced at the Grouping to provide Collett with a firm policy for the future.

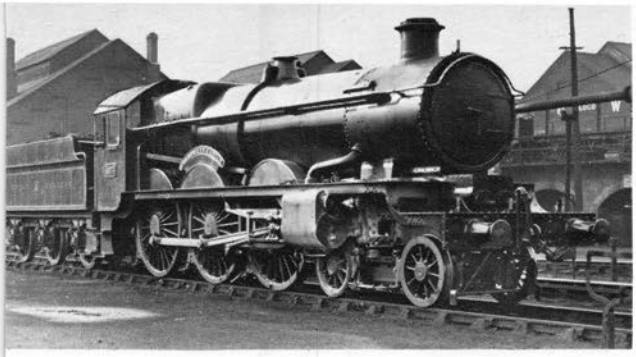
In every day service, Churchward's No 111 *The Great Bear*, which was Britain's first Pacific certainly *looked* magnificent, but it did not demonstrate any real superiority over the splendid performances of Churchward's smaller 'Star' class four-cylinder 4-6-0s, and when a need arose for more powerful express passenger engines after World War I, Churchward did not attempt to improve, or modify, his Pacific design. Instead, he proposed a larger 'Star', with the big standard No 7 boiler he had recently introduced for his large 4700 class 2-8-0s, at the same time he also intended fitting the large boiler to his 'Saint' class 4-6-0s and 2800 class 2-8-0s. But it was realised that it would not be possible to build such engines, for the time being at least, as their weight would exceed that permitted by the Civil Engineer.

By 1923 the need for a more powerful engine than the 'Stars' was definite, and Collett based the new design directly upon the Churchward engines, in enlarged form. The layout of the frames and the spacing of the wheels remained the same, but a new boiler

**6P until 1951.*

Below: 4073 class 4-6-0, with original tall chimney. The later chimney design decreased the height by 3in. The drawing depicts a 'Castle' attached to the standard 4000gal Collett tender.



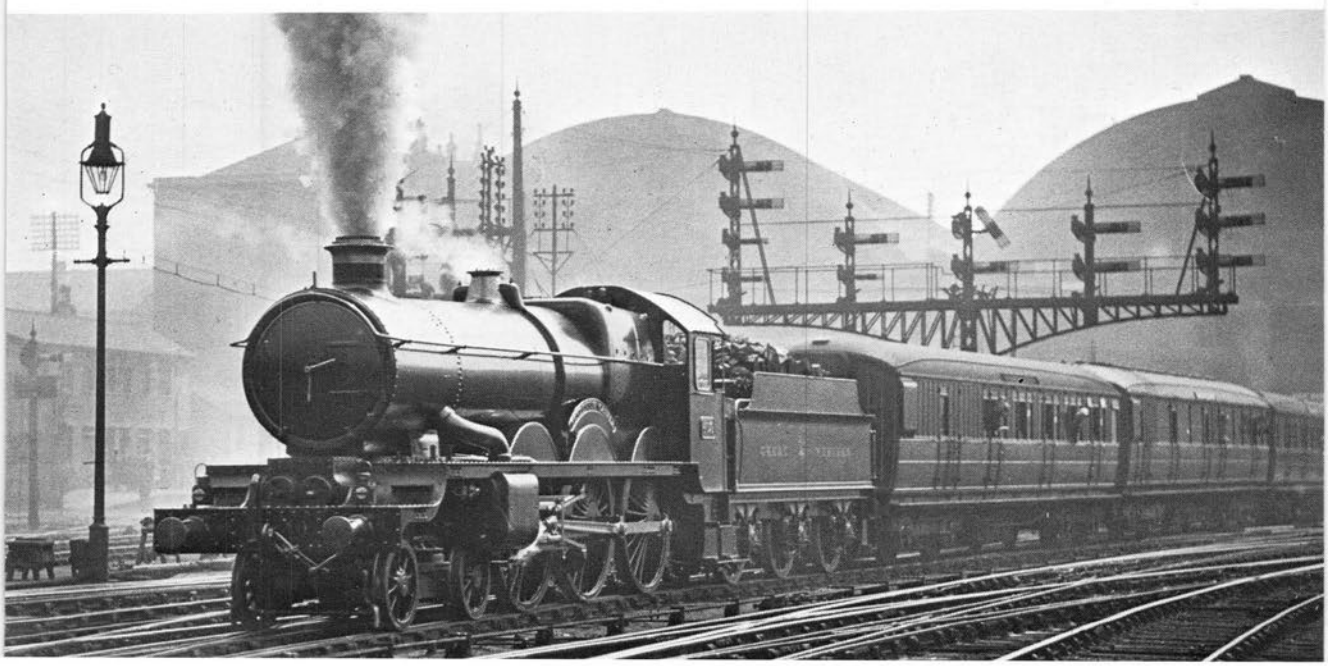


Left: First of the legendary 'Castle' class 4-6-0s, No 4073 *Caerphilly Castle,* completed at Swindon in August 1923, and seen here in original condition with narrow outside steampipes and diagonal rain strip on the cab roof. Compared to Churchward's classic 'Star' class 4-6-0, from which it was developed, the most noticeable new feature was the enlarged cab, with side windows. A standard 3500gal tender is attached, and bogie brakes are on the engine (a feature of the first 10 engines built; later removed.) The introduction of No 4073 also saw the welcome return to fully lined livery, in place of the austerity plain green introduced during World War I. The following nine engines of the initial batch were delivered between December 1923 and April 1924. The eleventh 'Castle' to appear was No 111, rebuilt from Churchward's *The Great Bear* (see page 7)./*Ian Allan Library*

Below: In the Palace of Engineering at the British Empire Exhibition at Wembley, in 1924, the Collett 'Castle' 4-6-0 No 4073 *Caerphilly Castle* was exhibited close to Gresley's Pacific *Flying Scotsman,* with the GWR proudly claiming the 'Castle' to be Britain's most powerful passenger locomotive. It was almost inevitable that such a claim should arouse a competitive spirit, and the outcome was the decision to run a technical test to prove which design was truly superior. The LNER put No 4079 *Pendennis Castle* to work between Kings Cross and Grantham or Doncaster, whilst the GWR ran Pacific No 4474 *Victor Wild* on the 'Cornish Riviera' between Paddington and Plymouth. No 4079 competed against Pacifics Nos 4475 *Flying Fox* and 2545 *Diamond Jubilee,* whilst No 4474 competed against 'Castle' 4-6-0 No 4074 *Caldicot Castle.* Both types ran extremely well, but the true honours went to the Collett 4-6-0s, and LNER observers were staggered by the smart acceleration and very economical fuel consumption of No 4079. Gresley subsequently adopted the Churchward-inspired longer valve travel and higher steam pressure, which greatly enhanced the performance of his Pacifics. *Pendennis Castle* is seen leaving Kings Cross during the exchange, which lasted from 29 April to 4 May 1925./*F. R. Hebron*

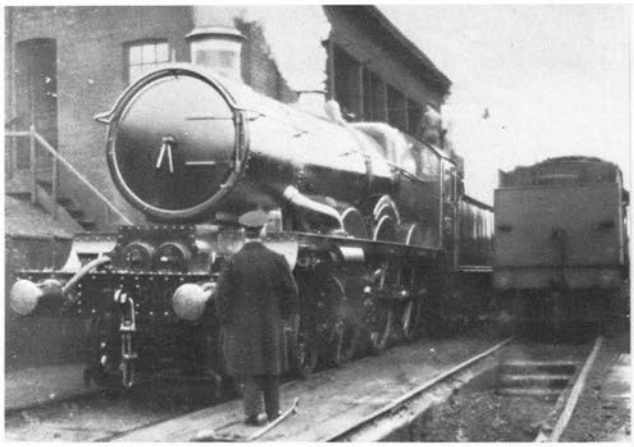
was designed, larger that that of the 'Star', but smaller than the 4700 class boiler originally proposed. Added to this the diameter of the cylinders was increased, and a much superior cab fitted. In essence, the new 'Castle' class was a compromise design, necessary to keep within the Civil Engineer's 20ton axle load restriction. Nevertheless, the 'Castles' were at least 10% more powerful than the 'Stars', and they succeeded them as the standard GWR express passenger locomotive. When first introduced they were the most powerful express passenger engines in the country; a fact which the publicity department was quick to exploit, when No 4073 *Caerphilly Castle* first appeared in July 1923.

The principal dimensions of the new engine were as follows. Four cylinders of 16in diameter by 26in stroke, drove on to coupled wheels of 6ft 8½in diameter. The new standard No 8 boiler had a tube heating surface of 1885.62sq ft, a firebox heating surface of 163.76sq ft and a superheater heating surface of 262.62sq ft, giving a combined total heating surface of 2312.00sq ft. The grate area was 30.28sq ft compared to



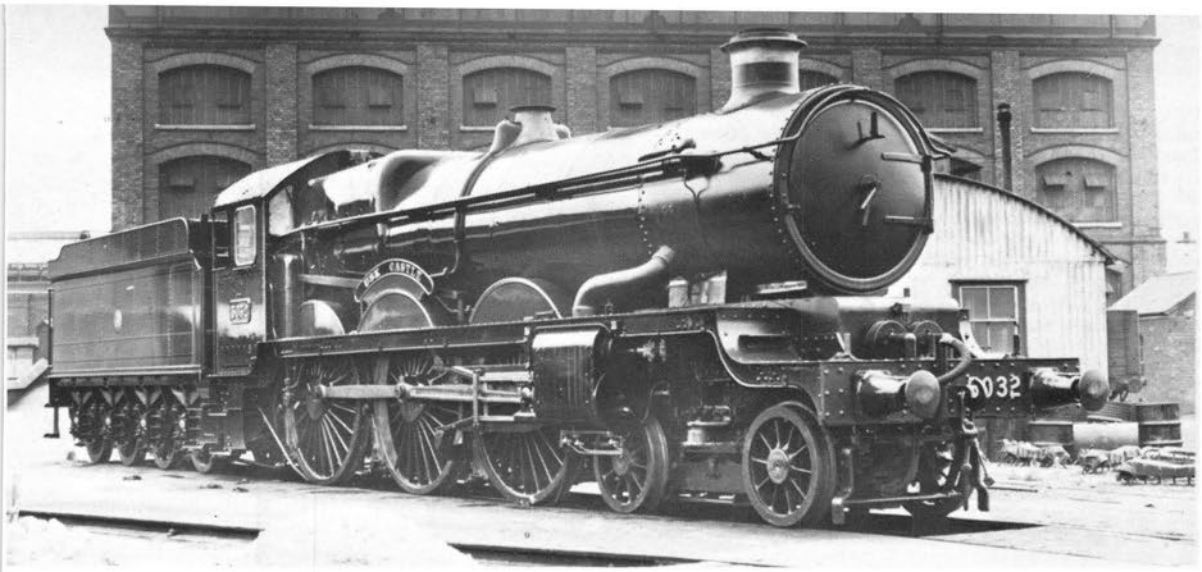
27.07sq ft for a 'Star', and the boiler pressure was 225lb. Tractive effort at 85% boiler pressure was 31 625lb, compared to 27 800lb for the 'Stars'.

The first engine commenced working in a 'Star' class roster for about six months, before the second engine of the 'Castle' class was completed, to establish beyond any doubt that the new design could go anywhere that a 'Star' could go, and so satisfy the Civil Engineer's department. Whilst the remaining nine engines of the batch were being built and delivered to service, No 4073 was withdrawn



Above right: In 1926 'Castle' class 4-6-0 No 5000 *Launceston Castle* was borrowed by the LMS, which was faced with something of a motive power crisis and experiencing much devious political wrangling behind-the-scenes. Fowler was in the midst of designing his proposed 'Pacific', but others in positions of authority decided to try out the GWR 4-6-0 on the Scottish expresses, first of all between Euston and Crewe, and then between Crewe and Carlisle with the Horwich dynamometer car. The engine duly demonstrated the excellent characteristics of the class, and presented a powerful and aggressive challenge to the indifferent LNWR 'Claughtons'. So impressed were the members of the LMS Board that they expressed a wish to have 50 'Castles' built at Swindon for them! However there were objections, and Swindon was next asked to supply a complete set of drawings to allow Derby to build them. The GWR Board were not sympathetic, and in any case there were loading gauge problems. The Fowler 'Royal Scot' 4-6-0 was born out of this remarkable situation, as a compromise solution to the urgent need for 50 powerful express passenger engines. No 5000 is seen here at the former Midland Railway shed at Carlisle Durran Hill, during the trials over the former LNWR main line./*E. S. Cox*

Below: In addition to new construction, Collett created 16 further engines of the 'Castle' class by rebuilding existing Churchward locomotives. Six of these were Nos 111, 4000/9/16/32/7 and ten were the final batch of 'Star' class 4-6-0s (The 'Abbeys'), Nos 4063-4072, which became 'Castle' class 4-6-0s Nos 5083-5092 respectively. Of the first six listed above, No 111 was the odd-man-out, being in fact a rebuild of Churchward's famous Pacific No 111 *The Great Bear* (see page 7), whilst the other five were rebuilt from 'Star' class engines bearing the same numbers. Former 'Star' 4-6-0 No 4009 *Shooting Star* is seen here in rebuilt form with new sections welded to the rear of the frames to take the longer firebox and the larger 'Castle' class cab. Tall safety valve bonnet is retained and larger 4000gal tender attached. No 4009 was renamed *Lloyds* in January 1936, and then 100 *A1 Lloyds* the following month. It ran until March 1950, when it was withdrawn five months before the final engine of the class was constructed (see page 25). The rebuilding of the 'Stars' was undertaken at random, when they became due for new cylinders and boilers. The old valve gear, motion and wheels were retained. */Lens of Sutton*



Above: A unique eight-wheeled tender was built as an experiment in 1931. This was No 2586 and was generally similar to the standard 4000gal Collett design, but it had eight wheels in rigid frames, closely spaced, and weighed 49tons 3cwt when fully laden. The tender is seen here attached to 'Castle' class 4-6-0 No 5032 *Usk Castle,* in ex-works condition in 1938 with the small GWR monogram painted on the sides. Other locomotives that ran with this tender attached, at various times, were Nos 5919, 5001/71/49/17, 6951, 5068, 4043/93, 4918 and 5957 (in order applied; with No 5032 being the third engine to have it.) Detail changes with this batch of 10, Nos 5023-5032 (produced after an interval of 5 years, up to 1932), included modified valve chest cover over the inside cylinders at the front end, and repositioned top lamp bracket; speedometer fitted to rear coupled wheels./*P. Ransome-Wallis*

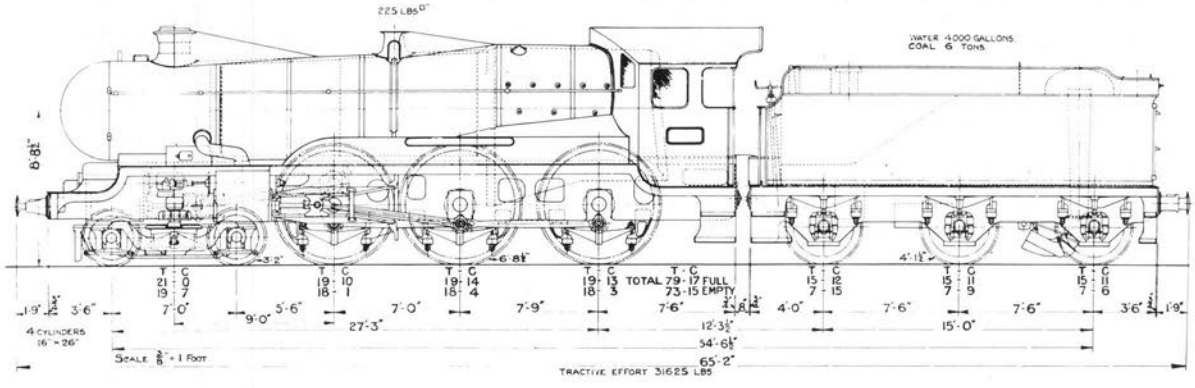
Below: The mid 1930s witnessed a vogue for streamlining, with American railroads setting the trend, and both Gresley on the LNER and Stanier on the LMS produced streamlined locomotives and trains. The GWR contribution (other than the diesel railcars, illustrated on pages 116-118) was an unfortunate attempt to place a streamlined shroud upon the classic profile of Swindon steam. The outcome was both bizarre and ineffectual! In 1935 the Board, with an eye to the publicity it would create, had Swindon produce a 'Castle' and a 'King' (see page 45) in this odd garb, and this official photograph of No 5005 *Manorbier Castle* was taken soon after delivery from Swindon in March 1935./*British Rail WR*

Below: Official Swindon diagram issued to show the modifications made to 'Castle' class 4-6-0 No 5005 *Manorbier Castle,* after some of the streamlined fairings had been removed. In particular, by comparison with the foregoing illustration, it can be seen that the front end has lost the casing over the bufferbeam and between the front of the bogie and the cylinders. The fairing on top of the 4000gal standard tender had also been removed. These modifications were made in 1936. In 1943 the round nose end was removed, together with the long splashers and the appendages to the rear of the chimney and safety valve, and finally, in early post-war days the Vee-shaped cab front was replaced by the normal pattern.

Bottom: 'Castle' class 4-6-0 No 5035 *Coity Castle,* of the batch of 10 built in 1935, photographed near West Wycombe with a Paddington-Birkenhead express in 1939. This picture shows clearly the modified cover for the inside cylinders at the front end, introduced with No 5013. Original tall chimney is carried; from No 5058 onwards a shorter chimney was fitted as standard and eventually all the class had shorter single chimneys, some being a cast iron version with copper cap, others being of the built-up type./*H. K. Harman*

from service, given a special exhibition finish, and got ready for the 1924 British Empire Exhibition, at Wembley, where it stood end-to-end with the Gresley LNER Pacific No 4472 *Flying Scotsman.*

The eleventh engine of the 'Castle' class to appear was in fact rebuilt from the Churchward Pacific No 111 *The Great Bear,* with the front section of the frames, ahead of the trailing coupled axle, being retained, and new rear portions welded on. This decision to withdraw the GWR's prestige symbol was taken by Collett because the engine had become due for expensive repairs to its unique standard No 6 boiler, including renewal of the inner firebox, and also because the excessive weight and length of the Pacific meant that it was restricted to the Paddington-Bristol main line. Some awkward questions were asked in high places as to why Collett had done such a shocking thing, and one outcome of this was



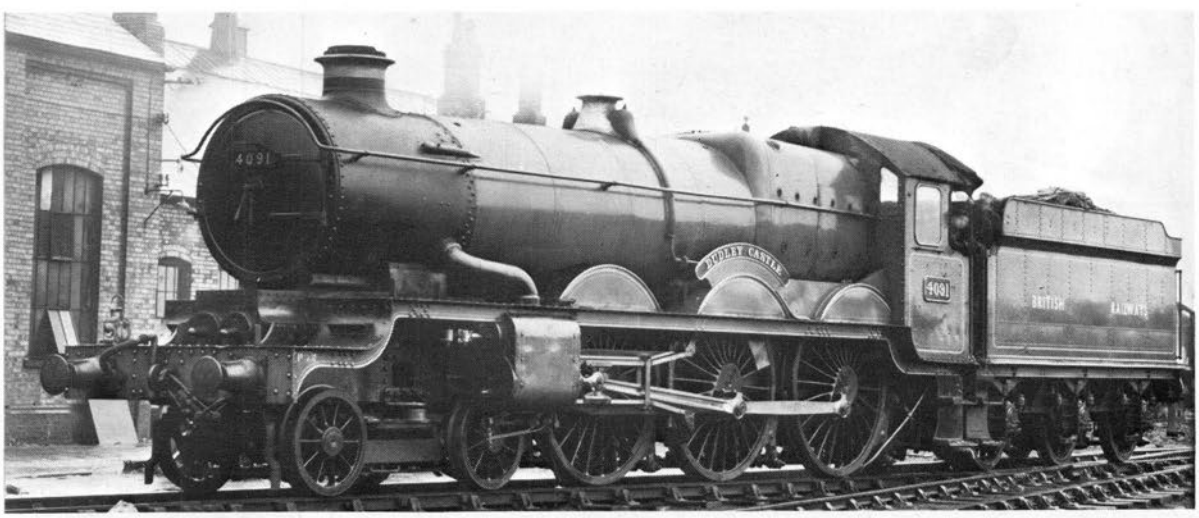
to bring the problems of engine design created by the Civil Engineer's insistence upon a 20ton axle load, to the attention of the General Manager, Sir Felix Pole. At the time, the new 'Castles' were performing extremely well on existing loads and schedules, with their 19½ton axle load, but when larger engines were required three years later, Sir Felix Pole took a personal interest and decreed that for these engines a 22½ton axle load would be necessary, and that the Civil Engineer (whom it turned out, had in any case been working to this figure for some time past) would have to have certain routes ready by July 1927. The outcome was the introduction of the magnificent 'King' Class 4-6-0, as described in Section 4.

To return to the 'Castles'. A few 'Star' class engines were rebuilt as 'Castles', with new sections welded to the back of the original frames (a 'Castle' was longer at the rear, to take the larger firebox and larger side window cab fitted). A change was made to the front-end frames of new 'Castle' class engines built from No 4093 onwards. Nos 4073-4092 had the frames set inward at the front to clear the leading bogie wheels, following the design used by Churchward for the 'Star', but from No 4093 straight frames were fitted, 'dished' to clear these wheels. Some older engines were later given the new frames during major overhaul at Swindon.

An interesting candidate for rebuilding as a 'Castle' was 'Star' class 4-6-0 No 4000 *North Star*, which as No 40 in 1906 had been Churchward's first four-cylinder engine,

Above: World War II air raid blackout precautions applied to the cab of 'Castle' class 4-6-0 No 4096 *Highclere Castle* in 1940. At first, engines just had the cab side windows painted black, but during 1940 the glass was removed and steel plates substituted, as seen here. Between mid-1945 and late 1947 the glass was replaced. Although this engine was turned out in fully lined green livery, later war-time livery was unlined green (for 'Kings' and 'Castles'), whilst all other classes were unlined black./*British Rail WR*

Below: Bright apple green livery, with red, yellow and grey lining, applied as an experiment by BR in 1948 to a number of locomotives on each Region, to test public reaction, (see also page 47.) New 'Castle' class 4-6-0s Nos 7010-7013 were finished in apple green, and Nos 4089/91, 5010/21/3 also received the livery as they passed through Swindon for overhaul. No 4091 *Dudley Castle* is illustrated; the smokebox numberplate was made of brass, not the standard cast iron. Fortunately the somewhat sickly colour scheme was not favourably received, and the existing GWR green, with orange and black lining, was adopted by BR instead, although it did not look so smart on former LNER, LMSR and SR locomotives, which did not have the copper and brass ornamentation to set the colour off./*Ian Allan Library*



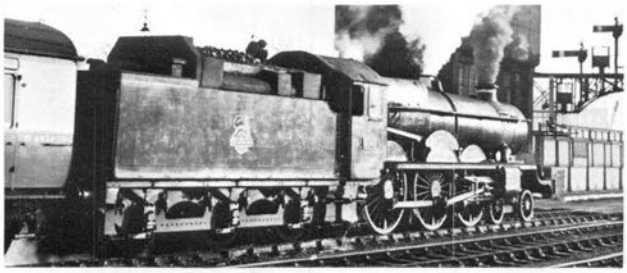
originally an 'Atlantic' but converted to a 4-6-0 in 1909. This retained its original frames, and the extra-high footplating, 2½in higher than all other 'Castle' class-engines, and at the same time had the original 'scissors' valve gear replaced by the standard inside Walschaerts layout.

A major development took place in 1932 with the building of Nos 5023-5032, after an interval of five years when no 'Castle' class engines had been built and the larger 'King' class had appeared. This batch of 10 were the first locomotives on the GWR (and in Britain generally) to be built to the new high standards of accuracy which could be achieved by using optical instruments to line up frames, axlebox guides and cylinders. Increased mileages between repairs were achieved, and henceforth older engines also received the benefits of repair work done to the new standards, which allowed closer limits to be worked on machined parts, without fear of overheating or binding.

Construction of the 'Castle' class was usually in batches of 10 at a time, and this policy together with the 'Star' class rebuilds resulted in 130 standard express engines of the type being in service in 1940 shortly before Collett retired, and when wartime conditions put an end to new construction of the class. It was May 1946, with F. W. Hawksworth as CME, before any resumption of building was possible, and the post-war engines Nos 5098/9, 7000-7037 introduced three-row superheating and (except for Nos 5098/9 when new) mechanical

lubrication for cylinders, valves and regulator. From 7008 onwards, new straight-sided tenders were fitted, with a weight of 49tons fully laden. In 1947 a new boiler was fitted to No 5049 *Earl of Plymouth*, with a four-row superheater. This involved moving the chimney forward, to clear the bulky header. Results with this engine justified fitting all new boilers with four-row superheaters, on the grounds of reduced water consumption and longer boiler life. Improved draughting to compensate for poor quality fuel, was also applied to the class, by a reduction of the diameter of the chimney liner and blast pipe and removal of the Churchward standard 'jumper top' of the blast pipe. Some early 'Castle' class engines, with two-row superheaters had meanwhile received the post-war three-row type during boiler changes, and the new type tender also found its way to pre-war engines.

The successful application of double blast pipe and chimneys to the 'King' class (see page 50) was followed by a similar trial fitting to a 'Castle'. The engine selected, No 7018



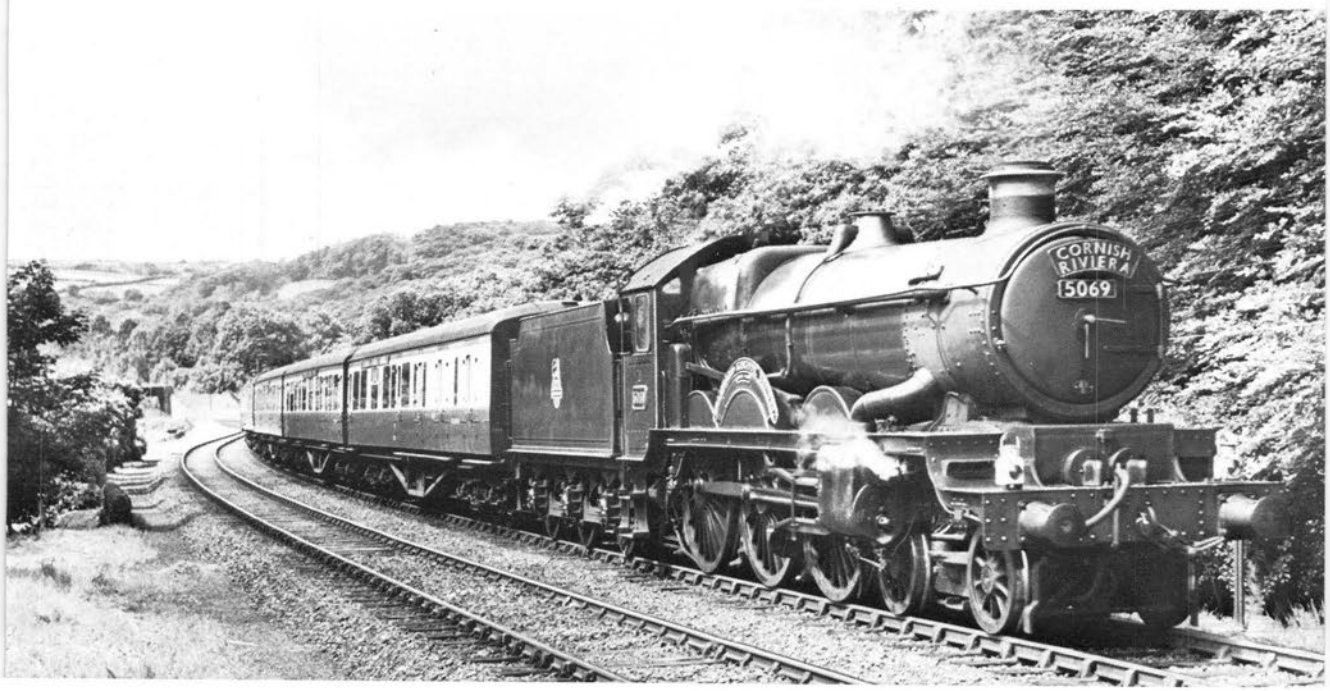
Above left: The final 'Castle' class 4-6-0 to be constructed, No 7037 with three-row superheater, emerged from Swindon in August 1950, and is seen here when brand-new with Hawksworth tender, on a running-in turn. No nameplates were fitted until 15 November 1950, when the engine was named *Swindon,* in honour of the Borough's Jubilee, by Princess Elizabeth. After naming No 7037 carried a special commemorative plate on the left-hand cab side and had the Arms of the Borough of Swindon on the centre splashers. Thus ended the construction of a class which spanned more than a quarter of a century. No 7037 was destined to last a mere 13 years in service, whereas original members of the class ran for up to 40 years, and it is a remarkable tribute to Collett that the 'Castle' class remained as the standard express type on the GWR, with only detail changes, right up to and including the early years of nationalisation./*Ian Allan Library*

Below left: 'Castle' class 4-6-0 No 4082 *Windsor Castle,* seen passing Kennington, Oxford, on 2 July 1951. This engine took part in the Stockton & Darlington Railway Centenary activities in June 1925. The previous year (April) it was driven from Swindon Works to the station by King George V, accompanied by Queen Mary, during a royal visit and subsequently carried brass commemorative plaques on the cab sides, above the numberplates. When arrangements were being made for the funeral train of King George VI from Paddington to Windsor, on 13 February 1952, this locomotive was not available. To overcome the problem an alternative locomotive, No 7013 *Bristol Castle* exchanged name and numberplates, and the exchange was permanent for the remainder of their careers. /*R. H. G. Simpson*

Dryslwyn Castle, was known to be an indifferent performer, and in May 1956 a fabricated double chimney was fitted. The engine had a three-row superheater boiler, and it was not until the second engine to be fitted with a double chimney, No 4090 *Dorchester Castle* was turned out, complete with a four-row superheater boiler, that the final development of the class was attained. This engine, and No 4093, had smokeboxes

Above left: Two Hawksworth pattern straight-sided tenders were built with coal-weighing apparatus. These had 3800gal, 6tons coal capacity and weighed 49tons 18cwt in full working order. One was painted in lined green, the other in lined black, and they ran attached to 'King', 'Castle', 'County' 'Hall' and 4300 class engines for road tests and other purposes. The tender seen here attached to No 5086 *Viscount Horne,* was the green-painted one, numbered 4127 and built in March 1952. Photographed at Oxford, on 8 January 1953./*H. C. Casserley*

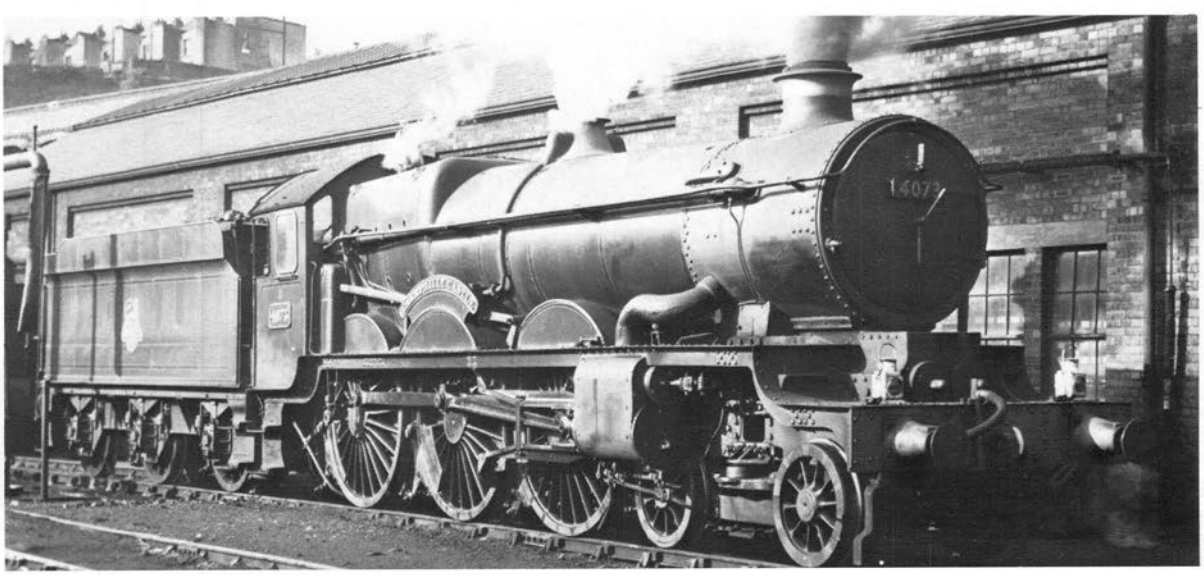
Below: The Hawksworth tenders found their way to earlier members of the 'Castle' class, as time went on, and one is seen here attached to No 5069 *Isambard Kingdom Brunel,* photographed in charge of the up 'Cornish Riviera' climbing between Lostwithiel and Bodmin Road, on 25 June 1955. Note the modified version of the inside valve casing at the front end, with squared top and treadplate finish (applied from 1946 onwards to most engines with straight type frames.) /*R. E. Vincent*



Above: 'Castle' duo. No 5078 *Beaufort* pilots No 5077 *Fairey Battle* on a lightly loaded West of England-South Wales express, on Dainton Bank; photographed 29 September 1955. These were two of the engines renamed to commemorate Battle of Britain aircraft types during World War II (see Appendix 2 page 119.) The leading engine had a Hawksworth tender, whereas the other still retained the Collett version originally fitted. */Ian Allan Library*

Below: Pioneer 'Castle' class 4-6-0 No 4073 *Caerphilly Castle,* photographed at Bristol Bath Road shed on 8 May 1955, with 32 years of active service to its credit. Comparison with the photograph reproduced on page 19, shows clearly the detail changes made to the engine's appearance since first introduced — in particular, the smaller chimney, larger lagging to the final type of outside steampipes, larger 4000gal tender and removal of bogie brakes. Rainstrip removed from cab roof and top lamp bracket lowered to the upper part of the smokebox door; vacuum pipe swan-neck reduced in height, and outside feed pipes to top feed on boiler, curved back behind the nameplate./*B. K. B. Green*

Above right: In 1956 Swindon gave No 7018 *Drysllwyn Castle* a thorough try-out on their test bed, and then modified it with a double blastpipe and chimney, retaining the existing three-row superheater. Road trials were then run, with the Swindon Dynamometer Car, on the "Torbay Express", seen here approaching Kingskerswell on 26 July 1956. A second engine No 4090 *Dorchester Castle* was rebuilt with a double chimney, but with a four-row superheater boiler, and this set the pattern for the final improvement to the class. No 7018 returned to Swindon early in 1958 for fitting with a four-row superheater boiler and improved mechanical lubrication, and was subsequently a star performer on the "Bristolian". Note the mechanical lubricator relocated in front of the outside steampipe; originally this was to the rear and above the leading coupled wheels, where it tended to get in the way when access was needed to the inside valve motion./*D. S. Fish*



four inches longer than standard (later removed from 4093.) A total of sixty-six 'Castle' class engines was modernised in their final years, with double chimneys and four-row superheaters, as listed in Appendix 2 Named Locomotives, on page 119, and just as in the case of the 'King' class, their steaming and performance on the road, in this final condition, was exemplary indeed.

The engines were built as follows:

Nos 4073-4082	Swindon	1923-24
Nos 111, 4000/9/16 32/7*	Swindon	1924-29
Nos 4083-4092	Swindon	1925
Nos 4093-4099 5000-5012	Swindon	1926-27
Nos 5013-5022	Swindon	1932
Nos 5023-5032	Swindon	1934
Nos 5033-5042	Swindon	1935
Nos 5043-5067	Swindon	1936-37
Nos 5068-5082	Swindon	1938-39
Nos 5083-5092*	Swindon	1937-40
Nos 5093-5097	Swindon	1939
Nos 5098-5099 7000-7007	Swindon	1946
Nos 7008-7027	Swindon	1948-49
Nos 7028-7037	Swindon	1950

**Rebuilds (Nos 5083-5092 were 'Star' class Nos 4063-4072 respectively.)*

In 1946-47 five 'Castle' class engines were converted to burn oil instead of coal (these were Nos 100A1, 5039, 5079, 5083 and 5091), but by the end of 1948 all had reverted to coal burning. No 5091 ran with a converted 3500 gallon tender, but the other four had the standard 4000 gallon type, with fuel tanks added. Sliding cab shutters were fitted to the outside of the windows (see also page 33).

As to their spheres of operation; in the early days the first 40 engines were allocated to

West of England expresses, but after the introduction of the 30 'King' class engines, they were to be found over most of the GWR system capable of carrying express passenger power, with the fast-timed 'Bristolian' included in their later-day rosters. In pre-war days they were the chosen engines for the 'Cheltenham Flyer'.

In their final form, with double chimneys and four-row superheaters the class were timed at speeds around the 100mph mark, but at all stages of their long careers, they had a

Left: In all, 66 'Castle' class 4-6-0s were fitted with double chimneys, and an elegant chimney shape was produced for them, with an elliptical cross-section and tapered sides, complete with copper cap. No 5094 *Tretower Castle* awaits departure from Bath Spa station, with a West of England-Paddington train on 23 June 1962./*G. A. Richardson*

Below: Double-chimney 'Castle' class 4-6-0 No 7013 *Bristol Castle* (originally No 4082 *Windsor Castle,* see page 25,) photographed at Reading with an express bound for Paddington. This engine, together with Nos 4087/8, 5084 and 7014, was fitted with a Davies & Metcalfe Patent valveless lubricator. This was located ahead of the outside steampipe on the right-hand side and had a reservoir mounted above it, as can be seen in this picture. Modified casing over the inside valve chests compared to picture on page 25, with raised centre portion of treadplate, needed to clear the additional webs that had been welded to the exhaust passages, by this time./*J. R. Carter*

fine reputation for their performance, with exceptional economy in coal consumption and excellent haulage capacity, plus an ability for sustained high-speed running. The results published by Collett of dynamometer car tests with No 4074 *Caldicot Castle,* when only three months old, in which the engine achieved the hitherto unheard of figure for economical performance of only 2.83lb of coal per drawbar-horsepower-hour, were at first openly disbelieved! History has vindicated Collett and these fine engines established his reputation as a great locomotive engineer. What other express passenger locomotive design remained a standard type for 38 years, and was built for no less than 28 years, with only detail changes to the original specification? The 'Castle' class was a fine tribute to the standards established by Churchward, and faithfully developed by Collett and Hawksworth.

First of class withdrawn: 100A1 (1950)*, 4091 (1959).
Last of class withdrawn: 5042, 7022, 7034.
Examples preserved: 4073, 4079, 5029, 5043, 5051, 5080, 7027, 7029.

**First of class to be withdrawn; formerly 'Star' class 4-6-0 No 4009. First 'Castle' proper to be withdrawn was No 4091 nine years later.*

Above: A second view of No 7013 *Bristol Castle,* showing the left-hand side, in final form, with double blastpipe and chimney; final pattern outside steampipes with increased radius curves. The double chimney had to be set well forward on the smokebox top, to allow clearance for the bulky four-row superheater header inside. In this final state, the engines concerned had self-cleaning smokeboxes and basket-type spark arresters fitted. No 7013 (ex-4082) was photographed at Worcester (Shrub Hill) on 14 July 1962./*Patrick Kingston*

Below: Portrait of power. The striking lines of a 'Castle' class 4-6-0 fitted with double-chimney, beautifully portrayed by No 5073 *Blenheim,* photographed as the engine was backing-up to the 11.45am Bristol-Paddington non-stop express at Bristol Temple Meads; platform 9. The introduction of main-line diesel hydraulics displaced the 'Castle' class and most were withdrawn by the end of 1964, despite the fact that the final engines, in the 7000 series had years of life left in them. No 7029 survived to see the end of steam on the Western, and together with seven others, has been preserved./*G. F. Heiron*

SECTION 2

4900 Class 4-6-0 2-cyl Mixed-Traffic Engines

Introduced: 1924
Total: 259†
GWR Classification: D, Red*
BR Power Class: 5MT
'Hall'

In his original outline scheme for standard GWR locomotives, Churchward had included a design proposal for a medium-sized mixed-traffic 4-6-0 with two outside cylinders, and 5ft 8in wheels; but he never introduced such an engine in his lifetime. (Collett finally produced it, when he introduced his 'Grange' class 4-6-0, in 1936, as described in Section 12, page 84.) In Churchward's scheme the 4300 class Mogul was the medium mixed-traffic engine which was actually built in quantity, and perhaps because it resembled the larger standard engines so closely, there was a tendency for footplatemen to expect too much of it, and for it to be overloaded. As a result of this there was pressure from the Running Department for the Mogul to be modified with a leading bogie, and the larger Standard No 1 boiler. In addition to gaining greater power, it was felt that this would improve the riding, as the Moguls had a tendency to nose at speed.

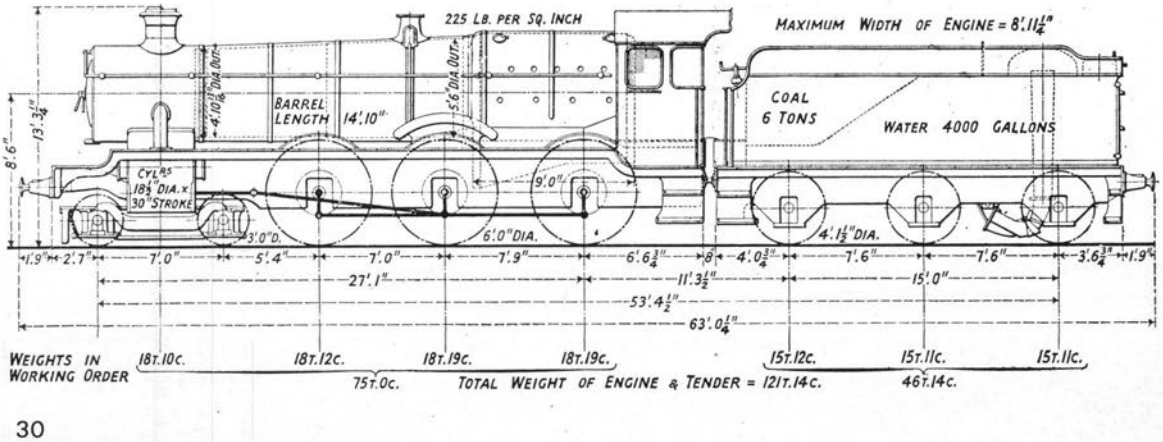
Rather than rebuild an existing 4300 class 2-6-0, Collett chose to modify a Churchward 'Saint' class two-cylinder 4-6-0, fitting it with coupled wheels of 6ft 0in diameter, in place of the original 6ft 8½in, and placing it in service for a prolonged period of evaluation. This was 'Saint' class No 2925 *Saint Martin*, originally built in 1907 and modified in 1924. The side window cab fitted by Collett gave the engine a more modern look, but the basic engine was still the Churchward 'Saint' in all respects except for the smaller coupled wheels. The prototype was thoroughly tested for a period of nearly three years before a decision was taken to multiply the class. It revealed itself as a thoroughly useful engine, able to tackle all kinds of traffic, and it was popular with running staff. Collett realised that here was the ideal general purpose machine, and that it would be able to replace not only the earlier of the 'Saint' class engines, but also the various 4-4-0s: the 'Atbaras', 'Cities', 'Flowers' and 'Counties'.

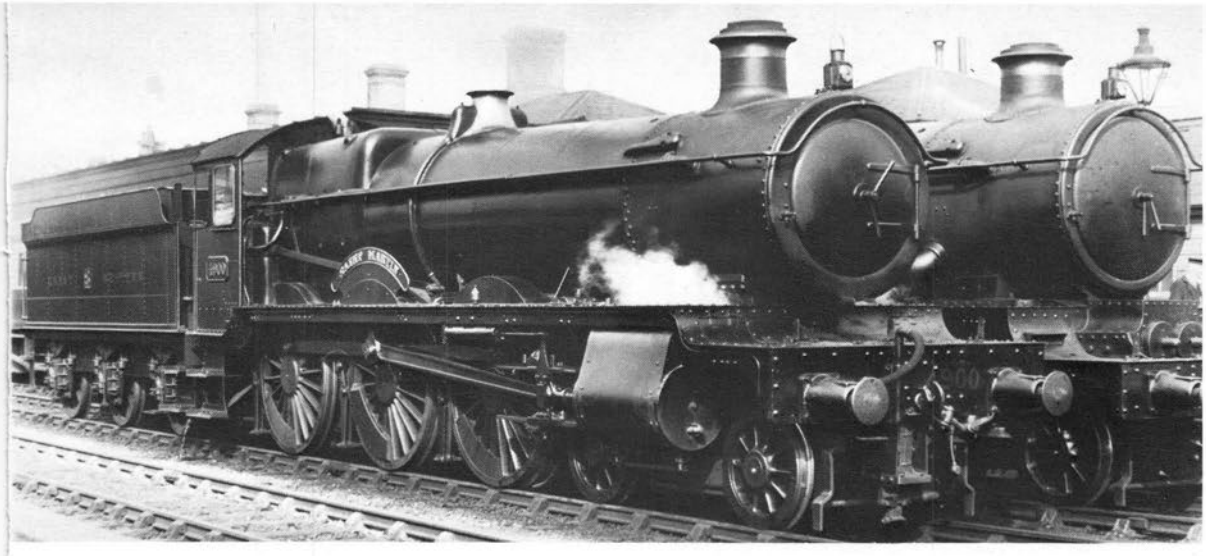
The principal dimensions of No 2925, as rebuilt with 6ft 0in coupled wheels, were as follows: Two cylinders of 18½in diameter by 30in stroke. Tube heating surface of 1686.60sq ft, firebox heating surface of 154.78sq ft and superheater heating surface of 262.62sq ft, giving a total combined heating surface of 2104.00sq ft. The grate area was 27.07sq ft, and the boiler pressure was 225lb. Tractive effort was 27 275lb at 85%, compared to 24 395lb, for the later examples of the 'Saint' class.

The first production order was for no less

†Total for original Collett version; see also page 93.
**A white suffix 'X' was added to some engines during World War II to denote that normal loading could be exceeded.*

Below: 4900 class mixed-traffic 4-6-0. The celebrated Collett 'Hall' class, developed from Churchward's two-cylinder 'Saint'.





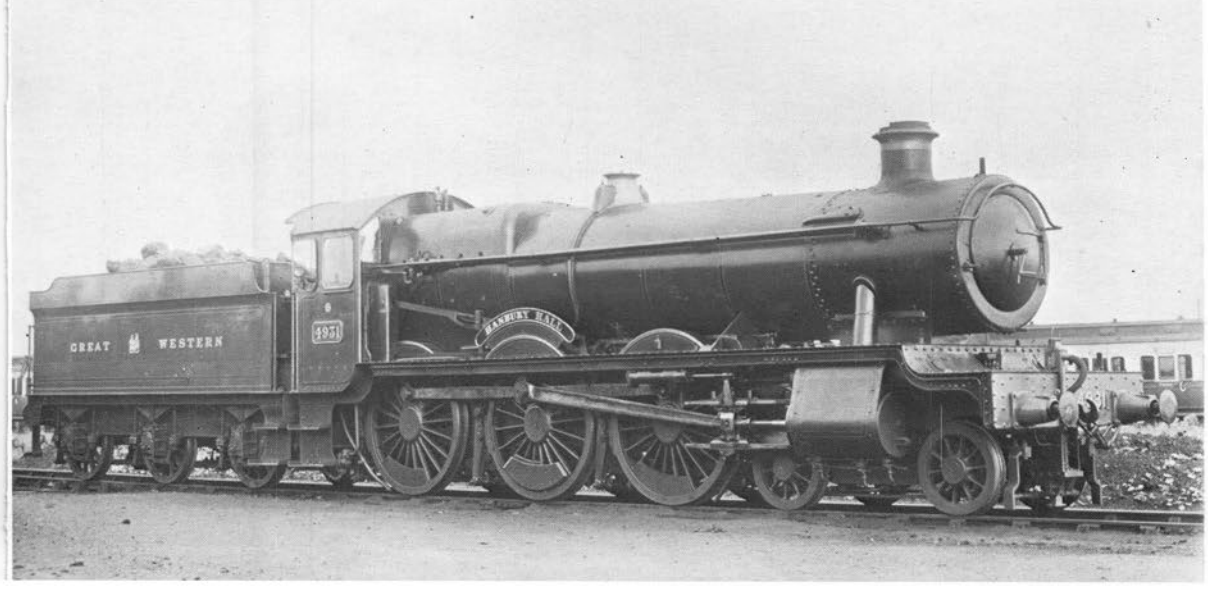
Above: Prototype engine for the 'Hall' class was rebuilt from the 1907 'Saint' 4-6-0 No 2925 *Saint Martin,* and appeared from Swindon in 1924. The major modifications were the use of smaller diameter coupled wheels, 6ft in place of 6ft 8½in, and a new cab, with side windows. No outside steampipes were fitted and the boiler was pitched lower, with the frames, by 4½in. A 3500gal tender was at first attached to the engine, of Churchward pattern; later replaced by a 3500gal Collett tender, as seen in this illustration. No 2925 *Saint Martin* was renumbered 4900 in December 1928. Top lamp bracket on smokebox top; ATC apparatus fitted below bufferbeam. */P. Ransome-Wallis*

Below: Production version of the 'Hall' class mixed-traffic 4-6-0, in as-built condition, typified by No 4931 *Hanbury Hall,* delivered from Swindon in 1929, and seen attached to 3500gal Collett tender (later replaced by the larger 4000gal version.) Top lamp bracket on smokebox top; no whistle shield. The production engines were delivered new with outside steam pipes, and the boiler was pitched higher than on *Saint Martin,* at 8ft 6in, as on the 'Saint' class proper. The bogie wheels were of reduced diameter, 3ft 0in compared to 3ft 2in on the prototype./*Ian Allan Library*

than 80 engines and these were virtually the same as the prototype, except for the provision of outside steam pipes, a raised boiler pitch, and detail alterations in accordance with Collett's modern practice. The diameter of the bogie wheels was reduced to 3ft 0in, compared to 3ft 2in on the prototype. Engine and tender total weight, in full working order, was increased by 3tons. Further batches were ordered with only minor changes in detail and construction was still in progress during World War II, so useful did the engines prove to be.

The engines were built as follows:

No	2925 (4900)*	Swindon 1924
Nos	4901-4980	Swindon 1928-30
Nos	4981-4999, 5900	Swindon 1931
Nos	5901-5920	Swindon 1931
Nos	5921-5940	Swindon 1933



Nos	5941-5950	Swindon 1935
Nos	5951-5965	Swindon 1935-36
Nos	5966-5975	Swindon 1937
Nos	5976-5985	Swindon 1938
Nos	5986-5995	Swindon 1939-40
Nos	5996-5999 6900-6905	Swindon 1940
Nos	6906-6915	Swindon 1940-41
Nos	6916-6958	Swindon 1941-43

**No 2925 was renumbered 4900 in December 1928.*

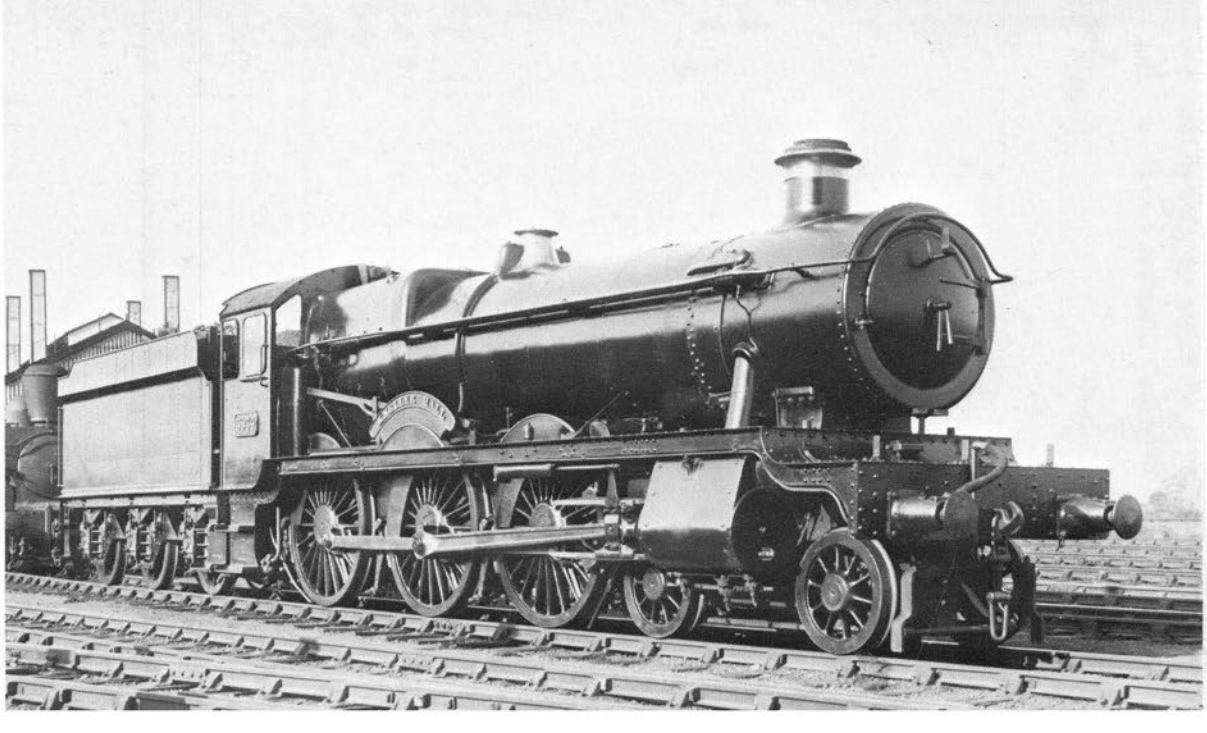
Commencing with No 6959, Mr Hawksworth introduced his 'Modified Hall' class, as described in Section 14 on page 93. A total of 330 engines, of which 71 were of the 'Modified Hall' type, made this class the largest single class to carry names on the Western.

First of class withdrawn; 4911 (1941)†, 4900 (1959).
Last of class withdrawn: 5971, 6923, 6932/7, 6951/2/3/6 (1965).
Examples preserved: 4920, 4930, 4942, 4983, 5900, 5952.

†No 4911 was withdrawn following extensive damage caused by a direct hit from a German aircraft, at Keyham, near Plymouth, on 29 April 1941. No 4900 was the first withdrawal proper, due to the greater age of the prototype compared to the production engines. Mileage run (including as a 'Saint' class 4-6-0) was a truly staggering 2 092 500 miles.

Above right: 3500gal Churchward tender, attached to 'Hall' class 4-6-0 No 4925 *Eynsham Hall,* built at Swindon in May 1929. These tenders, and the Collett 3500gal tenders, were later replaced by 4000gal tenders of standard Collett pattern. The Churchward tenders weighed 40tons full, and the Collett 3500gal tenders weighed 45tons 3cwt. Single handrail below window on cab sides./*LPC*

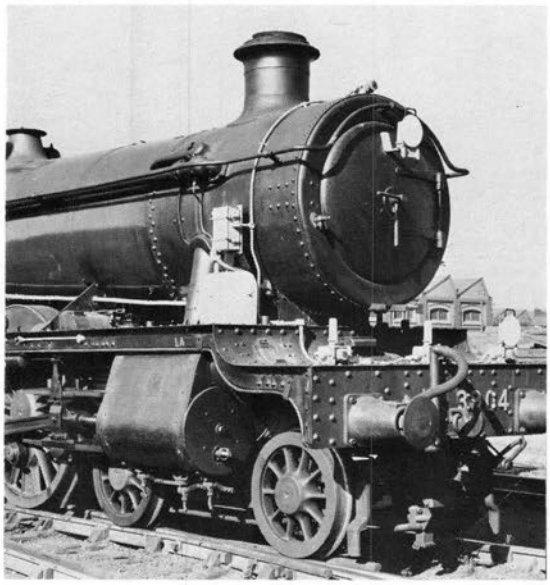
Below: 'Hall' class 4-6-0 No 5943 *Kneller Hall,* built in 1933 and fitted with 4000gal Collett tender; whistle shield provided and top lamp bracket carried on smokebox door. The 4000gal tender weighed 46tons 14cwt in full working order, and became the standard for the class. Note the additional vertical handrail beside the cab window; later engines had an L-shaped handrail fitted, which combined the two. Commencing with No 5921 a fireiron casing was added to the side of the firebox, on the left-hand side of the engine, as shown on page 33. */Ian Allan Library*



Above: A 1935 scene at Exeter St David's, with low sunlight catching 'Hall' class 4-6-0 No 4970 *Sketty Hall* as the locomotive enters the station on a through working from the Midlands to the West Country, with LMS coaches at the rear. The 'Hall' class proved to be quite at home on all types of traffic, and won a fine reputation for themselves. W. A. Stanier produced a basically similar design for the LMS in 1934 — his famous 'Black Five', of which no less than 842 were constructed. Stanier went to the LMS from the GWR, where he had been Collett's principal assistant./*Donovan E. H. Box*

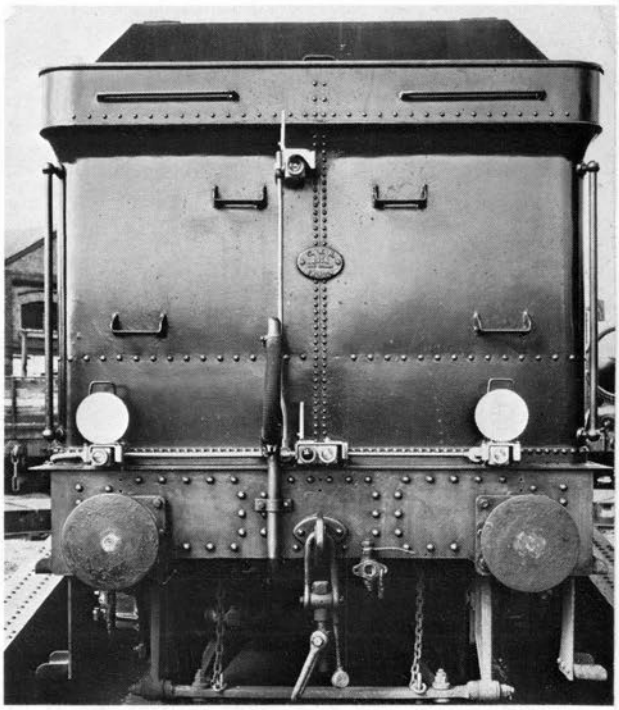
Centre right: Between 1946 and 1950, eleven 'Hall' class engines ran as oil-burners. The first engine to be converted was No 5955 *Garth Hall,* in June 1946, and the rest were done in 1947. All the engines were renumbered in the 3900 series, but No 5955 ran with its original number until October 1946, when it became No 3950. In this official photograph, the engine is in post-war plain green livery, with a 3500gal tender and sliding shutters on the cab sides. No 3950 was reconverted to coal burning in October 1948 and received back its former number, 5955. Note the fireiron casing behind the centre and rear splashers, alongside the firebox./*British Rail WR*

Bottom right: 'Hall' class 4-6-0 No 3952 (ex-No 6957) *Norcliffe Hall,* working as an oil-burner, with a 4000gal Collett tender conversion. The engine ran in this state from April 1947 to March 1950, when it reverted to coal-burning and received the number 6957 once again. It was photographed hard at work on the Sunday 11.05am down Paddington-Bristol & Taunton express, near Durston on 3 August 1947./*Pursey C. Short*

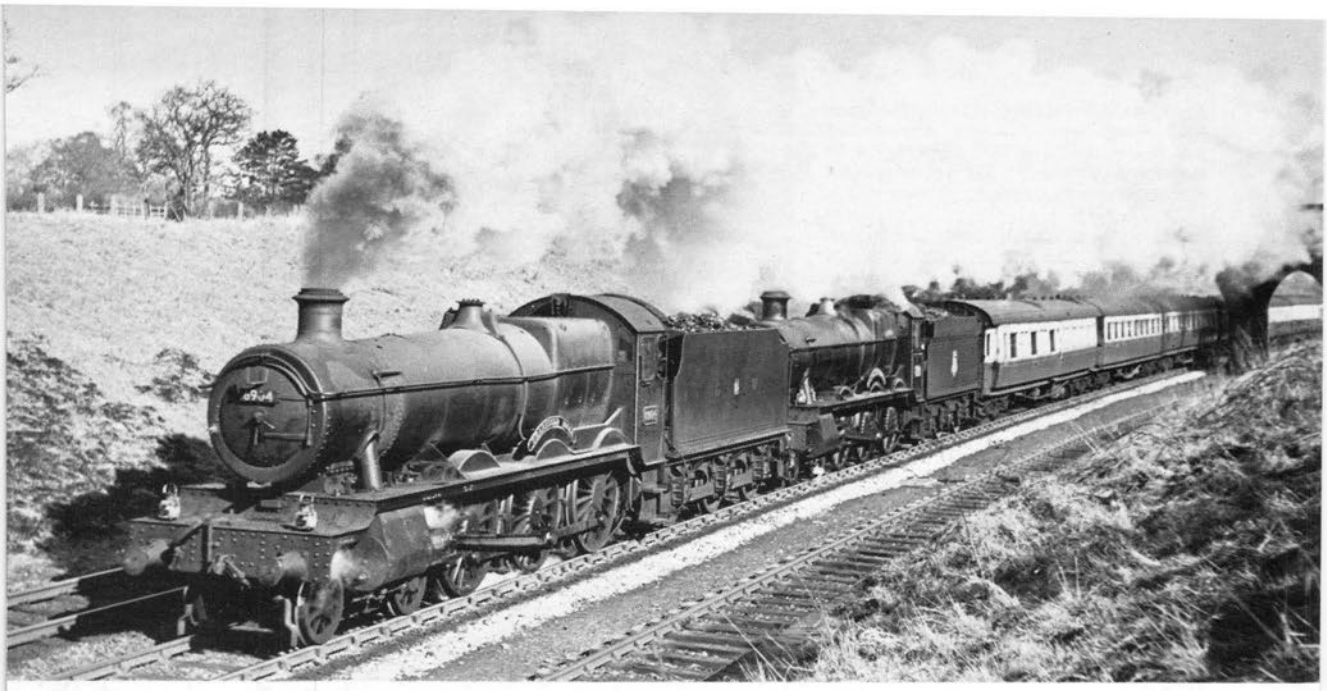


Above: Oil-fired 'Hall' class 4-6-0 No 3904 (ex-No 4972) *Saint Brides Hall,* photographed at Swindon in 1947 after the engine had been fitted with experimental electric lighting. No 5922 also received electric lighting, in 1949. It was later removed from both engines. The top headlight was mounted on the smokebox top, with a separate bracket on the door, and the lower three were combined; white headcode discs were supplied. */British Rail WR*

Above right: Rear of Collett 4000gal tender, with oil fuel tank fitted and electric lighting, modified lamp brackets and white headcode discs. This tender was attached to 'Hall' class 4-6-0 No 3904 (formerly No 4972) *Saint Brides Hall,* which ran as an oil-burner from May 1947 to October 1948. No steam heating hose fitted; standard GWR tender oval works plate clearly visible, bearing the legend 'GWR 2918. 4000 Gallons. Swindon.'*/British Rail WR*



Below: Pioneer 'Hall' class 4-6-0 No 4900 *Saint Martin* photographed leaving St Erth station with a down mixed-traffic train on 15 March 1951. The engine was fitted with non-standard short outside steampipes (due to lower-pitched boiler) in 1948. It was the first of the class to be withdrawn from service, in April 1959, with the exception of No 4911 *Bowden Hall,* which had been withdrawn in 1941 after receiving a direct hit from an enemy aircraft, at Keyham, in April of that year. */B. A. Butt*



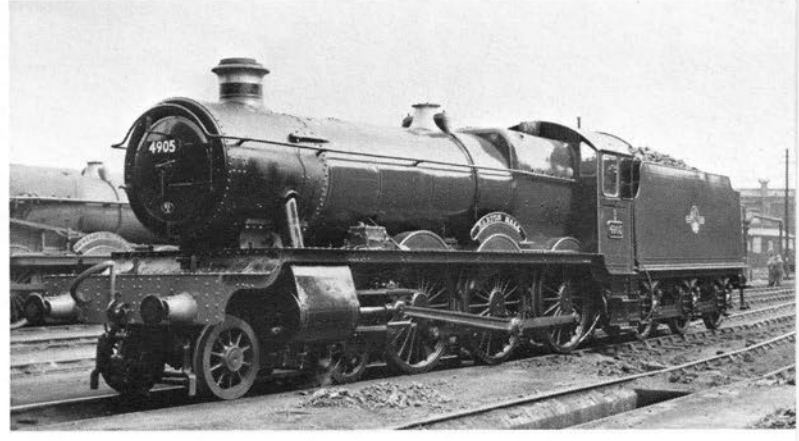
Above: A colourful combination, as two 'Hall' class 4-6-0s climb Hatton Bank with the 10.00am Paddington-Wolverhampton *via* Oxford on 28 February 1953. The leading engine, No 6904 *Charfield Hall,* is still in post war GWR livery of lined green with the coat of arms flanked by the initials GW on the tender. The train engine is No 5960 *Saint Edmund Hall* and the locomotive is in BR lined black livery whereas the tender is in lined green, due to a substitution since leaving the works./*R. J. Blenkinsop*

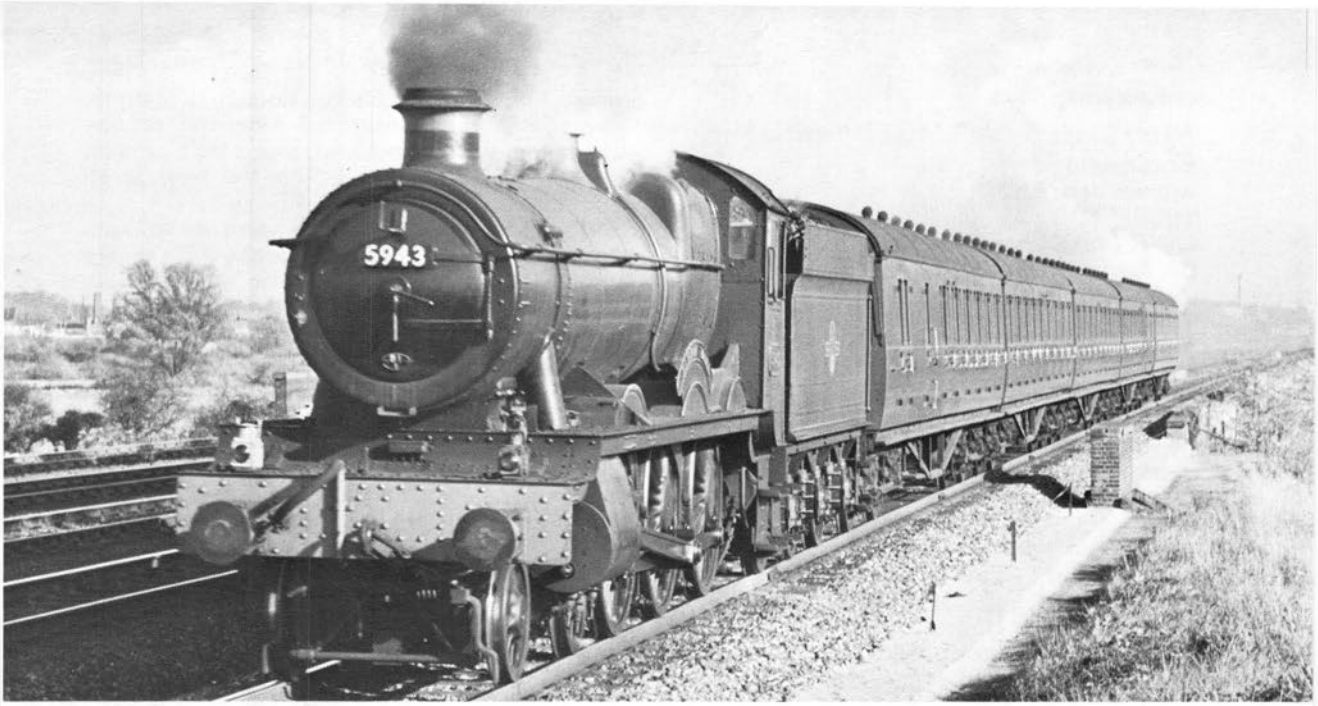
Below: Immaculate ex-works condition, with lined black BR mixed-traffic livery, seen on 'Hall' class 4-6-0 No 4930 *Hagley Hall;* photographed on a running-in turn, the 11.23am Bath-Swindon stopping train, at Box on 7 October 1952. The train is approaching Box Tunnel, and Mill Lane Halt and the portals of Middle Hill Tunnel are just discernible through the arch on the left of the picture./*P. M. Alexander*

Top right: 'Hall' class 4-6-0 No 6955 *Lydcott Hall,* fitted with indicator shelter and attached to the GWR Dynamometer Car, at Swindon on 10 March 1958, whilst engaged in special brake test trials./*G. Wheeler*

Centre right: An early example of the 'Hall' class seen in later BR days, attached to a Hawksworth flush-sided 4000gal tender and fitted with a mechanical lubricator ahead of the leading splasher on the left-hand side. No 4905 *Barton Hall* was photographed in ex-works condition, painted in fully lined BR passenger green livery, at Swindon in February 1958. The engine was then 30 years old, but certainly did not look it! /*G. Wheeler*

Below: Also attached to a post-war Hawksworth tender, No 6921 *Borwick Hall* was photographed on shed at Plymouth Laira on 29 May 1963, two years before withdrawal from service. The engine has the smaller diameter chimney, which some 'Hall' class engines carried after they had received boilers from later 'Modified Hall' class engines, with improved draughting (see pages 96-97.)/*Alec Swain*





Above: Humble duty for a 'Hall'. No 5943 *Elmdon Hall,* recently ex-works in fully lined BR passenger green livery, seen approaching Iver on the 12.45pm Paddington-Oxford train on 2 November 1957; composed of five close-coupled suburban coaches./*K. L. Cook*

Below: 'Hall' to the rescue! No 6942 *Eshton Hall* hurries the up 'Red Dragon'' through Taplow station on New Year's day 1962, presumably substituted for the rostered locomotive. What a splendid sight it made as the slipstream raised a cloud of powdery snow along the length of the train!/*British Rail WR*

SECTION 3

5600 Class 0-6-2T Mixed-Traffic Tank Engines

Introduced: 1924
Total: 200
GWR Classification: D, Red
BR Power Class: 5MT

Many of the engines acquired by the GWR from the former Welsh railways, as a result of the Grouping, were found to be in deplorable condition and had to be scrapped. Collett decided upon a policy of overhauling and improving the better ones, in many cases by fitting Churchward standard boilers and other GWR standard components. Nevertheless, this left a serious motive power shortage, because the existing standard GWR tank engines were not ideal replacements for the obsolete Welsh classes, partly due to the fact that they had outside cylinders, whereas the more compact inside-cylinder 0-6-2T had been the most widely used type. To meet this specific need, and to produce an engine which could work in the widest possible terrain, Collett decided to carry on with the South Wales tradition, and to produce a new standard 0-6-2T class, with inside cylinders.

The new 5600 class was a remarkably powerful type for its size, and had the standard No 2 boiler and as many standard parts as was possible. The wheels, hornblocks and valve gear were all of new design, however. The inside cylinders had 8in piston valves and Stephenson valve gear employed was an adaptation for inside cylinders of the valve gear for 18in by 30in outside-cylindered engines. A new design of three-bar motion crosshead was introduced, and later a smaller version of this was used on the new small standard 0-6-0PT and 0-4-2T.

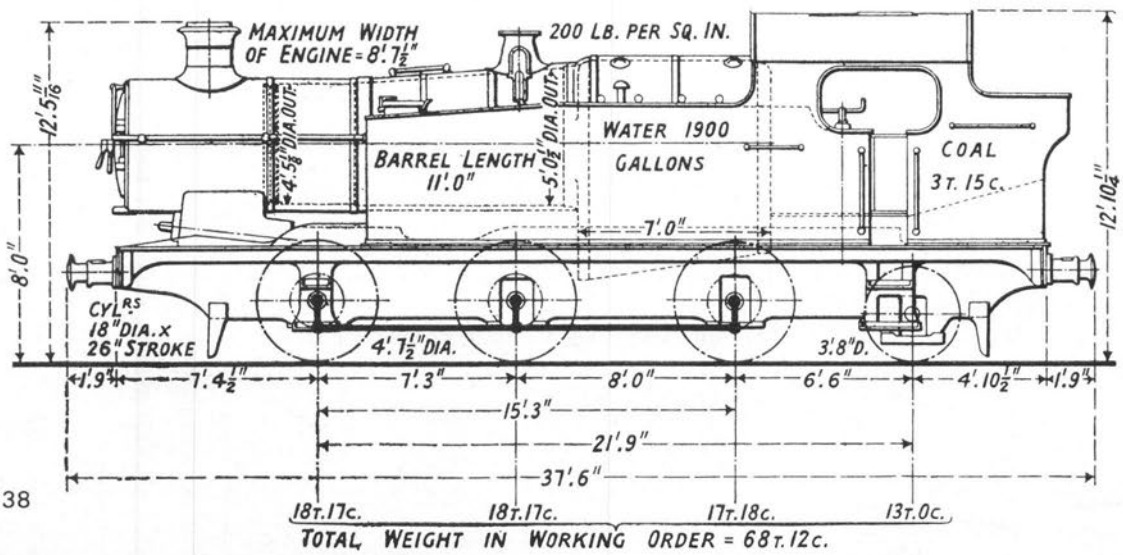
The principal dimensions were as follows: Two cylinders of 18in diameter by 26in stroke driving on to coupled wheels of 4ft 7½in diameter; tube heating surface of 1144.95sq ft, firebox heating surface of 121.80sq ft and superheater heating surface of 82.20sq ft; giving a combined total heating surface of 1348.95sq ft. The grate area was 20.35sq ft, and the boiler pressure was 200lb. Tractive effort at 85% was 25 800lb.

The engines were built as follows:

Nos 5600-5649	Swindon	1924-25
Nos 5650-5699	Swindon	1926-27
Nos 6600-6629	Swindon	1927-28
Nos 6630-6649	Swindon	1928
Nos 6650-6699	Armstrong Whitworth	1928

The orders for a total of 200 engines were pressed forward without delay, and the 50 engines built by Armstrong Whitworth, at Scotswood-on-Tyne, were delivered at the steady rate of five engines per week. This was an early instance of Collett using outside locomotive builders, as well as Swindon, for new construction.

The 5600 class were popular with their crews, and soon established a reputation for their power, acceleration and speed capabilities. They found regular use on both



passenger and freight work, and an interesting feature of their workings in the Welsh valleys was that they were normally used chimney first up the valleys and bunker-first coming down, when the guiding wheels gave them greater stability at the higher speeds. Other areas which received some of the class, included the Wolverhampton Division and Bristol, Swindon and Westbury. Later they were to be found in the London area, and at Worcester, but the Welsh valleys retained the bulk of the class to the end of their days.

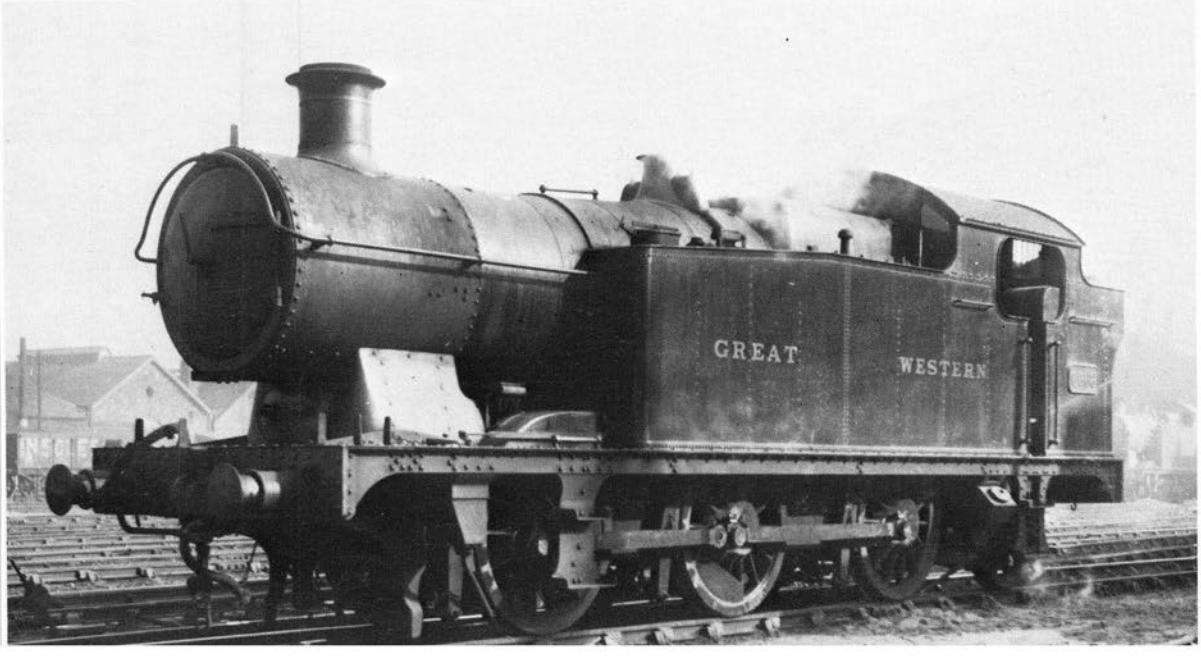
First of class withdrawn: 5636, 5639, 5683, 6687 (1962).
Last of class withdrawn: 5605 (1966).
Examples preserved: 5619, 5637, 5643, 5668*, 6619, 6695*, 6697.

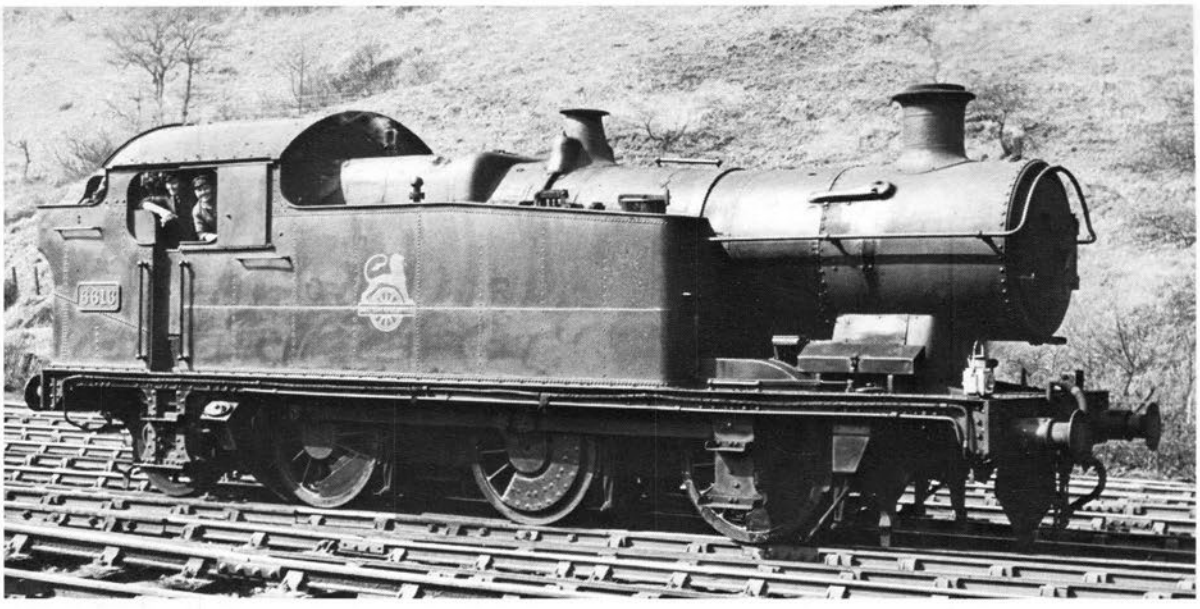
**Still in Barry scrapyard at the time of writing.*

Below left: 5600 class 0-6-2T for South Wales traffic.

Above: Official Swindon works photograph of 5600 class 0-6-2T No 5600, in as-built condition and painted in shop grey for photographic purposes; taken on 19 November 1924. Tall safety valve bonnet; tapered buffer housings; front footstep ahead of coupled wheels. The class had distinctive chimneys, with a copper cap and no capuchon and, with flush joins between the top of the casting and the copper cap. Note the very small balance weight originally fitted to the centre coupled wheels.

Below: 5600 class 0-6-2T No 6666, built by Armstrong Whitworth, in 1928. Compared to the previous illustration of the first engine built, features to note are the parallel buffer housings; relocated front footstep (set back directly in front of the leading coupled wheel) and small version of the standard safety valve bonnet. No 6666 is seen in the original condition of the later batches of the class./*Real Photographs Co.*



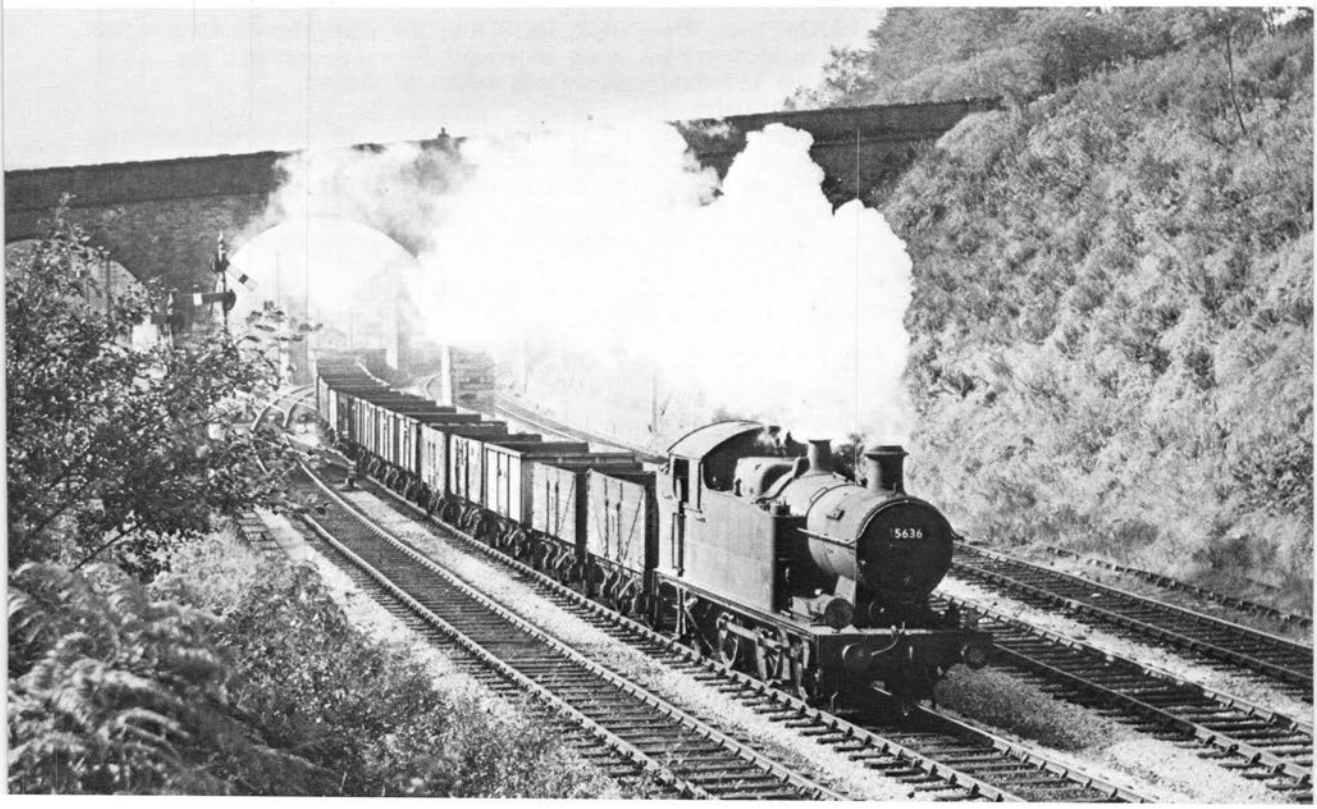


Above: 5600 class 0-6-2T No 6616, photographed in BR black livery at Duffryn yard on 16 April 1955. Modifications made to the class over the years included the provision of sliding cab shutters for increased weather protection, recessed rear bunker top, and steam and vacuum pipes placed along outside valance. ATC was fitted to the majority of the class. Note the toolbox in front of the leading splasher. Balance weights of much heavier type fitted to coupled wheels, a modification found to be necessary to reduce severe wear and tear on the coupled axleboxes./*R. E. Vincent*

Below: Ten crowded non-corridor carriages form the 9.15am Blaenavon-Barry Island excursion train, through Barry Dock on 10 June 1957, with 5600 class 0-6-2T No 6693 in charge and working bunker-first. This view illustrates the modified rear to the bunker, with the top recessed, and with a raised fender which housed the top lamp bracket. The leading carriage of the train is one of the unique low-height restricted loading gauge vehicles, specially built in 1939, for use on the Burry Port & Gwendraeth Valley line. After withdrawal of the line's passenger services in 1953 the seven specially-built carriages were used in normal trains elsewhere in South Wales./*J. Hodge*

Above: Some of the 5600 class received plain green BR livery in 1957, and later the same year a start was made on repainting them in fully lined green, as seen here on No 6624, photographed at Radyr shed on 30 September 1961. The engine is in the final condition of the class, and has an oddity in the form of two top lamp brackets, one on the smokebox door and one (the original) on the smokebox top! A tall safety valve bonnet was carried because the engine was from one of the earlier batches, Nos 5600-5699, 6600-6649 which were fitted with them when built./*J. White*

Below: Characteristic view of a 5600 class 0-6-2T, at work in the Welsh Valleys. No 5636, with a non-standard capuchon-fitted chimney, was photographed at the head of an up train of empty coal wagons, bound for Elliot Colliery in the Rhymney Valley, and seen passing Penrhos Junction on 4 October 1957./*S. Rickard*



SECTION 4

6000 Class 4-6-0 4-cyl Express Passenger Engines

Introduced: 1927
Total: 30
GWR Classification: Special Double Red*
BR Power Class: 8P†
'King'

The culminating stage in the development of the GWR four-cylinder express passenger locomotive, begun by Churchward with his 'Star' class of 1906, and carried on by Collett with his 'Castle' class of 1923, was the production of the magnificent 'King' class in 1927. The design was the logical enlargement of established GWR practice and represented the answer to the General Manager's request for 'super-power', to be built in time for the introduction of the 1927 summer service.

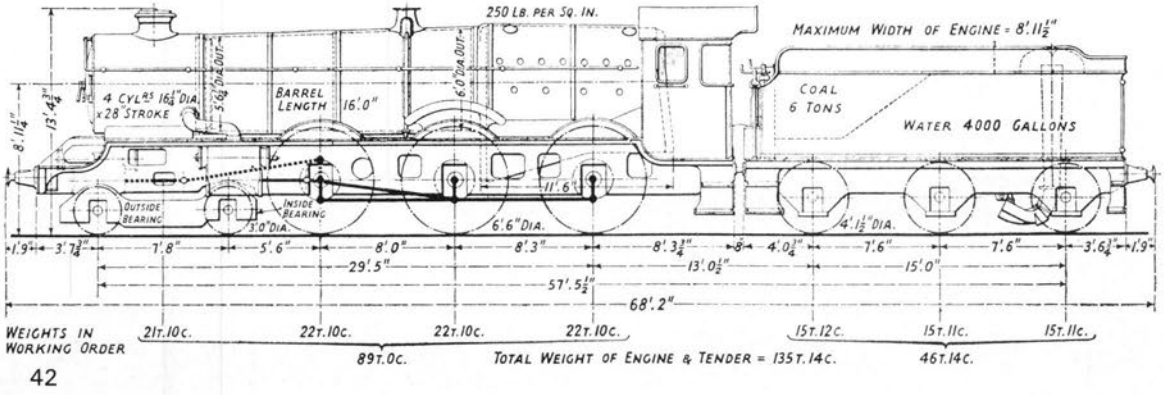
Train loads were steadily increasing and the stage had been reached where the splendid 'Castle' class 4-6-0s were not considered powerful enough for the future traffic needs, despite the fact that they were the heaviest engines permissible for operation at express speeds, at the time. The design of the 'Castle' class had been a compromise (see page 18) in order to keep weight down, and the engines carried a smaller boiler than that which had been originally proposed in Churchward's later days.

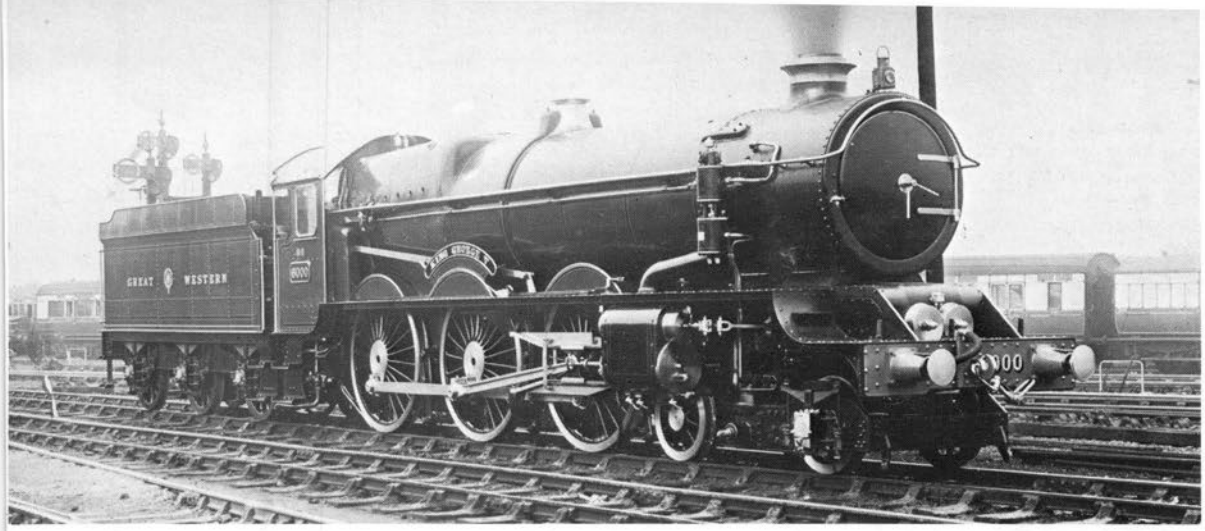
The limiting factor upon locomotive development in the mid 1920s was the imposition of a 20ton axle load restriction by the Civil Engineer, and it was the eventual order from the General Manager that parts of the GWR main line must be brought up to a standard whereby an axle load of 22½tons was permissible, that allowed Collett to proceed with the design of the 'Kings'. The background story to this improvement in the permissible axle loading has been told many times before, and need not be repeated here, but it is interesting to recall that one of the factors leading up to it was Collett's decision to rebuild the Pacific No 111 *The Great Bear* as a 'Castle' class 4-6-0, much to the distress of the GWR Board, as mentioned on page 7.

The routes cleared for 22½tons axle load were the West of England main line between Paddington and Plymouth, via Westbury or Bristol, and the Paddington to Wolverhampton line, via Bicester. This limited the number of new engines that would be required, leaving the smaller 'Castle' class to handle other routes and traffic. In addition to the steadily increasing train loads, another factor behind the General Manager's request for 'super-power' was that by 1926, the other three main line companies had caught up on the 15-year lead that Churchward had established for GWR locomotive design, and with Gresley's improved Pacifics, Maunsell's powerful 'Lord Nelson' 4-6-0 and the imminent appearance of Fowler's 'Royal Scot', the 'Castle' class had been overtaken in terms of power, at least in the eyes of the Publicity Department. Prestige had to be restored and the 'King' class was the answer! Despite the forecast of heavier train loads, it is worthwhile noting that it was not until 1930 that the platforms at Paddington were extended to accommodate the longer trains that would be needed.

The first indication of what form the new engine would take was the placing in service of 'Castle' class No 5001 *Llandovery Castle*, following a general repair, with the coupled wheels having new tyres turned down to a

No power class was shown; only route availability.
†7P until 1951.



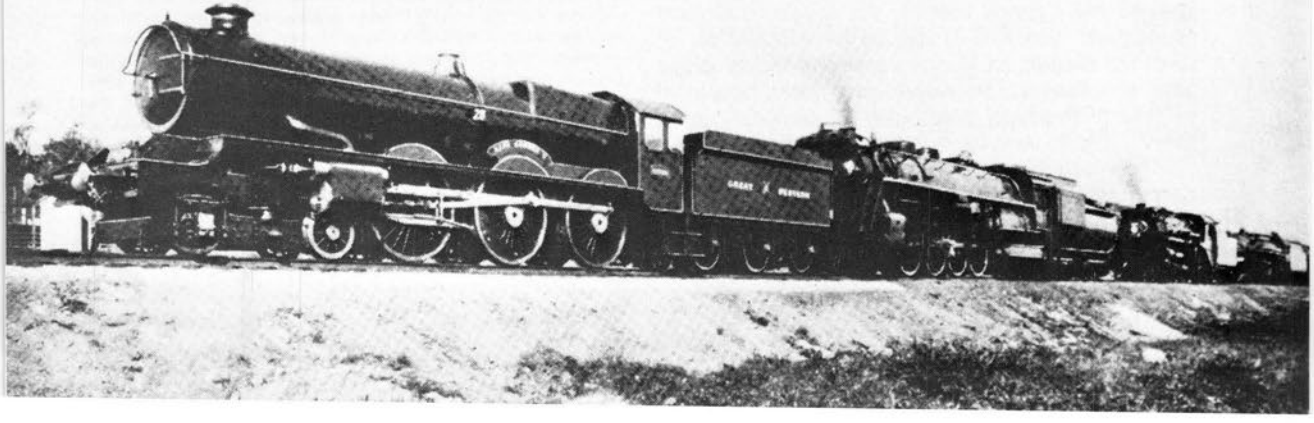


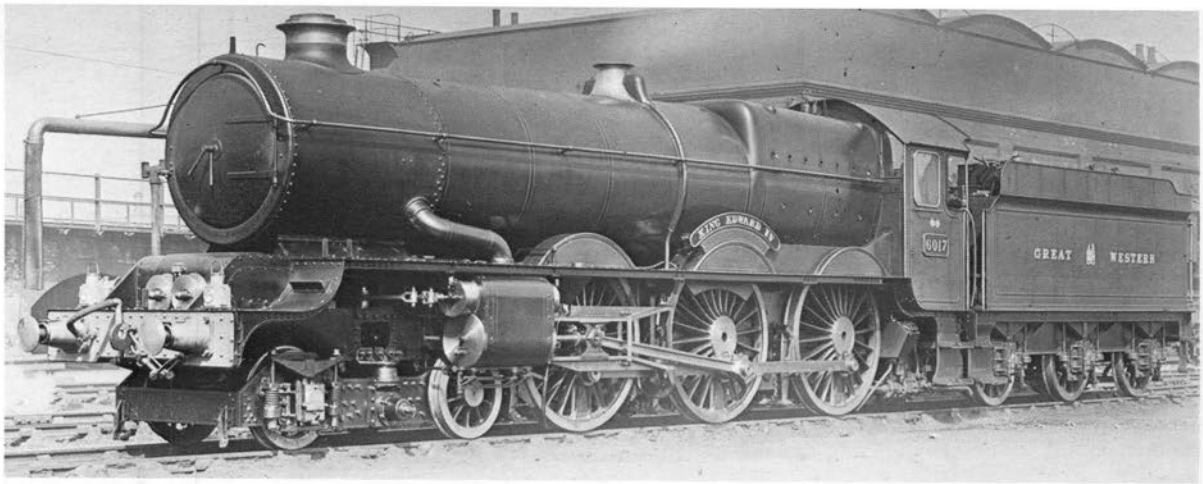
Below left: 'King' class 4-6-0; final development of G. J. Churchward's four cylinder express passenger design. The drawing depicts the class as first introduced.

Above: 'King' class 4-6-0 No 6000 *King George V,* photographed in as-built condition, but with the Westinghouse brake fitted, in preparation for shipment to North America, in 1927. Features of interest on the engine at this early stage included leading bogie wheel suspension in its original state without supplementary helical springs on the bogie spring hangers; top lamp bracket on smokebox top; straight feed pipe to top feed from base of boiler, and first design of piston valve casing and spindle covers for the inside cylinders. GWR Garter coat-of-arms on the tender (Nos 6000-6005 were the last new engines built to carry this). All the engines were delivered to service fitted with ATC./*Ian Allan Library*

Below: No 6000 *King George V* was shipped from Cardiff Docks to Baltimore, in semi-dismantled state on the deck of the SS *Chicago City,* arriving on 21 August 1927. The engine was chosen to lead the procession of engines in steam at the Baltimore & Ohio Railroad Centenary Exhibition, as seen here, with the standard Collett tender dwarfed by the Canadian National 4-8-4 No 6100, that followed. The Americans were deeply impressed by the superb finish and quiet running of the new 4-6-0. Picture taken prior to receiving the warning bell and bogie front spring modification./*British Rail WR*

diameter of 6ft 6in, compared to 6ft 8½in. This engine was placed on crack trains and proved to be quite satisfactory, with the result that the smaller wheels were adopted for the new class, despite the fact that this broke away from Churchward's standards. In a number of other respects the 'King' class design was a departure from these standards, although the overall concept adhered to his principles and practice. These departures were necessary in order to overcome some difficult points in the design, and to achieve the increase in power that had been requested. In particular there was the novel design of the leading bogie, with outside bearings for the leading boxes and inside bearing boxes for the trailing axle. This arrangement was necessary to give adequate clearance, on curves, between the main frames and the bogie wheels and suspension, due in part to the desire to keep the centre line of the inside cylinders horizontal (a Churchward feature) which meant there was restricted clearance at the leading axle end of the bogie. The actual





design of the bogie departed from Churchward's bar frame design and had plate frames with the four axleboxes individually sprung. The wheel diameter was reduced to 3ft, compared to 3ft 2in, and the bogie wheelbase was increased by 8in, to 7ft 8in.

Compared to the 'Star' and 'Castle' designs, the engine length and wheelbase were increased, partly in order to take the new, larger, standard No 12 boiler specially designed, and partly to spread the greater weight over more length. As a result, Collett 'stretched' the 4-6-0 layout practically to its limit for British conditions and the 'King' class was the largest, heaviest and most powerful engine of the type ever built. He certainly used the 22½tons axle load to full advantage.

The large standard No 12 boiler was designed with the pressure raised by 25lb, to 250lb psi, which together with an increased

Top: 'King' class 4-6-0 No 6017 *King Edward IV,* in original condition, and clearly showing the supplementary helical springs fitted to the hangers of the outside frame leading bogie suspension; a modification made following the derailment of No 6003 in August 1927. The original design of cover for the front of the inside cylinders is clearly seen; this was carried by the first 20 engines. Collett's standard 4000gal tender was always used, and matched the classic lines of the engines extremely well. Special 'double red' route colour discs painted on cab side above numberplate./*Ian Allan Library*

Above: With a 13 coach load behind the tender, an unidentified 'King' class 4-6-0 makes a fine study passing Twyford East Box in pre-war days, under the watchful eye of the signalman. GWR publicity for these magnificent engines was lavish indeed and they became a household word in next to no time, enjoying enormous popularity and adulation from the schoolboys of the day. In an attempt to steal a little of the thunder, the LMS prefaced a publicity leaflet about their own new 4-6-0s, the 'Royal Scot' class, with the following quotation: 'Greater than the people, or the Kings, we are everything on earth, but Gods'. Great Western fans, of course, knew better than that! */Ian Allan Library*

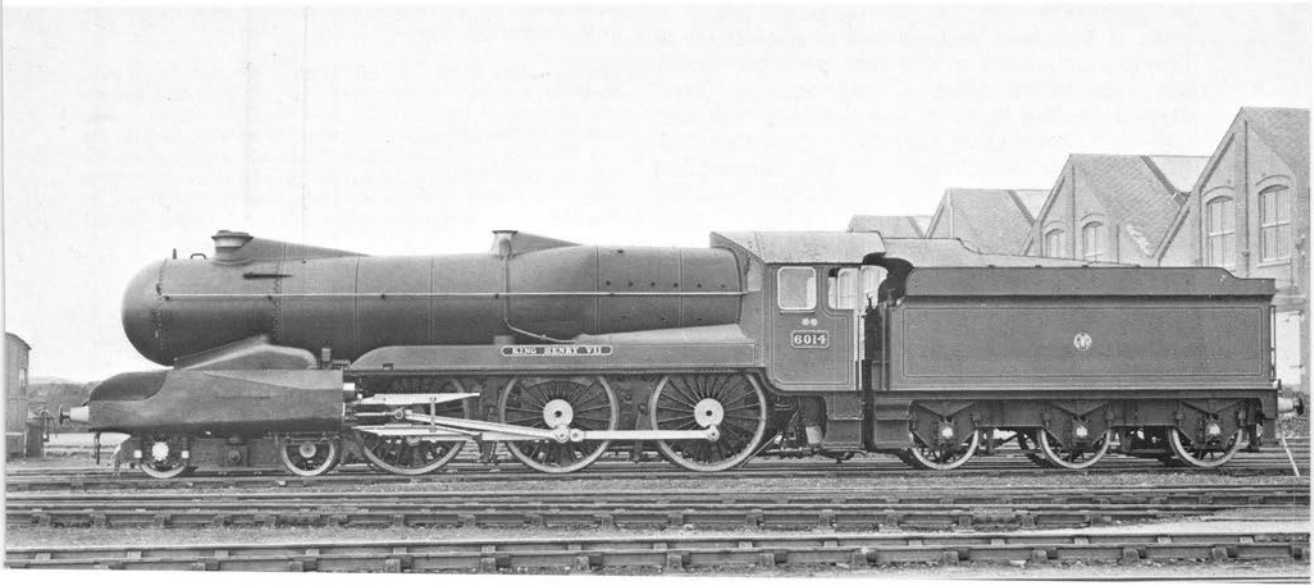
cylinder diameter and stroke, and the smaller diameter coupled wheels, brought the tractive effort at 85% boiler pressure to 40 300lb, an increase of 27% over the 'Castle' class tractive effort of 31 625lb. Adhesive weight was increased by 15 per cent.

The principal dimensions were as follows: four cylinders of 16¼in diameter by 28in stroke, driving on to coupled wheels of 6ft 6in diameter; tube heating surface, 2007.5sq ft, firebox heating surface, 193.5sq ft and superheater heating surface, 313.0sq ft; giving a combined total heating surface of

Top left: A second batch of 10 locomotives of the 'King' class appeared from Swindon in 1930, Nos 6020-6029. The first of these, No 6020 *King Henry IV,* is illustrated here, with the small GWR roundel on the tender which was favoured by the company during the 1930s. Detail changes with this second batch included modified covers for the inside cylinders at the front end; feed pipe on boiler side (to top feed) curved back behind the nameplate (earlier engines were later modified accordingly) and top lamp bracket lowered to a position on the smokebox door./*Collection: Author*

Centre left: In March 1935 the Great Western Railway released 'King' class 4-6-0 No 6014 *King Henry VII* back to traffic with a partially streamlined exterior, similar to that applied to 'Castle' class 4-6-0 No 5005 *Manorbier Castle* which appeared the same month (see page 22.) The publicity department were presumably behind this exercise, but no one at Swindon seemed keen, and no further engines received this unnecessary and unattractive appendage. Churchward's classic lineage, as developed by Collett, just did not lend itself to treatment in the so-called 'modern' manner! /*British Rail WR*

Below: This official photograph of No 6014 *King Henry VII,* at Swindon on 8 March 1935 is of particular interest because it shows the streamlined fairing added to the top of the tender (a feature of No 5005 also.) It was only a matter of months before this impractical feature was removed from the tender! /*British Rail WR*



2514.0sq ft. The grate area was 34.3sq ft, and the boiler pressure was 250lb. The piston valves were 9in diameter.

The engines were built as follows:

Nos	6000-6019	Swindon 1927-28
Nos	6020-6029	Swindon 1930
No	6007*	Swindon 1936

**No 6007 of 1936 was a nominal replacement engine for the original engine of that number, which was badly damaged in the Shrivenham disaster of 15 January 1936, but, in fact, was subsequently repaired and returned to stock.*

Swindon received the first drawings for the 'Kings' in December 1926, and despite the original intention to have them ready for the 1927 summer service, it had by then been put back to having the first engine ready by the end of October. However, the GWR Board had been busy making negotiations, behind the scenes, to send the first of the new engines to America for exhibition at the Baltimore and Ohio Railroad's 'Fair of the Iron Horse'. This meant that the engine had to be ready for shipment by early August, and some fast work (with some components being produced by a three-shift working over 24hours) ensured that the first engine, No 6000, was completed in time.

In America the engine had the honour of leading the procession, and it created a most favourable impression because of the superb finish, workmanship and clean lines it displayed. After the exhibition No 6000 ran a trial return trip over the B&O between Baltimore and Philadelphia, with a dynamometer car, on 17 October 1927. A train of 485 tons was hauled at speeds up to 74mph. Souvenirs of the visit were carried by the locomotive after it returned to GWR service, in the form of the warning bell and two commemorative medals on the cab sides. An amusing side effect of the impression made by No 6000 whilst in the USA, was the subsequent appearance of a few new American locomotives with rather ineffectual attempts to imitate the smooth Swindon finish — even to the extreme of using copper cap chimneys!

The first 20 engines of the 'King' class quickly settled down to assume an important role in day-to-day GWR locomotive running,

Top: Stage-by-stage the semi-streamlined shrouds were removed from No 6014, as they were found to impair routine maintenance procedures. By June 1939, when this photograph was taken, all the fairings around the front end, over the cylinders and the outside steampipes had gone, leaving the bulbous nose and long splashers, the Vee-shaped cab front and the odd appendages to the chimney and safety valves. *King Henry VII* was in charge of a Birkenhead-Paddington express when caught by the camera, approaching Princes Risborough. */H. K. Harman*

Above: In May 1936, the final engine of the class to be built, No 6029, was taken in for overhaul and renamed *King Edward VIII,* by gracious consent of the new King. The engine is seen here on its first passenger turn, after the naming; passing Old Oak Common on 22 May 1936. The picture shows clearly the later design of inside cylinder valve spindle cover and casing (Nos 6020-6029), and the top lamp bracket located on the smokebox door. The engine ran with the name *King Stephen* from August 1930 until May 1936./*Ian Allan Library*

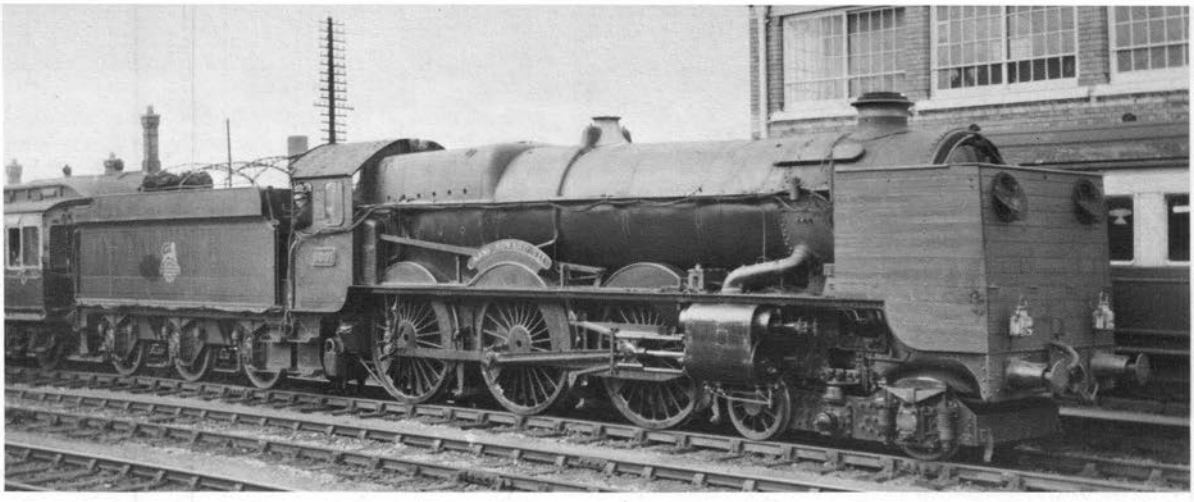
Above: In somewhat less than pristine condition, with 23 years of service behind it, No 6000 *King George V* was photographed on an up Weston-super-Mare train, leaving Reading station in April 1949. Presentation bell carried on front end, to commemorate the part No 6000 played in the Baltimore & Ohio Railroad centenary celebrations, plus two medals (awarded to the engine at the same time) on the cab side. The engine is seen in hybrid BR livery, with the lettering British Railways on the tender in former GWR style. Top lamp bracket lowered to position on smokebox door./*M. W. Earley*

Below: During the experimental livery phase in the summer of 1948, when the new BR Railway Executive was testing public reaction to various proposed colours for locomotives and rolling stock, four 'King' class 4-6-0s were painted in deep ultramarine blue (similar to the former Great Eastern Railway colour) with red, yellow and grey lining out and Gill sans lettering on the tender. These were Nos 6001/9/25/6, and No 6009 *King Charles II* is seen here in the dark blue livery, at Old Oak Common shed. Subsequently the entire class were painted in the standard light blue livery, with black and white lining, before the blue was abandoned in favour of Brunswick green, on the grounds that it did not wear well in service./*Collection: Author*

and an aura of favourable publicity surrounded them in pre-war days. An early problem was encountered with the bogie suspension, which came to a head when No 6003 *King George IV* was derailed at about 60mph on straight track at Midgham, between Reading and Newbury; fortunately only the leading bogie wheel came off, and the driver was able to bring his train safely to a stand. But this led to modified suspension being introduced, with supplementary helical coiled springs to the hangers of the leading laminated springs. No 6000 had this alteration made whilst in America and prior to running over B&O tracks. A tendency for the engines to pitch and roll, when new, was cured by modifications to the suspension and the axleboxes of the trailing coupled wheels.

Detail changes were made to the engines over the years, including the provision of speedometers and whistle shields, and the second batch of 10 engines, Nos 6020-6029, had different front covers for the inside steam chests (see page 46). During World War II, the cab side windows were removed as a blackout precaution (see page 23), but these were quickly restored from 1945 onwards.

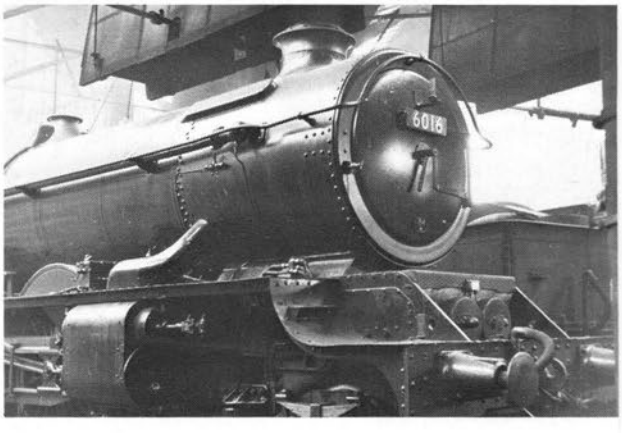
It was in the vastly changed conditions of post-war days, with F. W. Hawksworth as CME, and with the threat of nationalisation looming large upon the horizon that the story of the 'King' class was taken a stage further. Hawksworth was convinced that increased superheating was necessary, to cope with the poor quality fuel of the time and he took No 6022 *King Edward III* and fitted a new



high temperature four-row superheater, in February 1948. As modified, No 6022 proved to be a great success, but because of the unsettled period in locomotive affairs created by the early days of nationalisation, the development was 'moth-balled' until 1951. From 1951 to 1955 34 'King' class boilers (spares included) were rebuilt with four-row superheaters. Mechanical lubricators were applied to the class from 1949 onwards, and improved draughting for the single chimneys was the other major development of this period. No 6001 was the first engine to receive this, with a longer chimney liner and a blastpipe, both of reduced diameter, and most of the class received this single chimney modification, which also involved removal of the chimney capuchon.

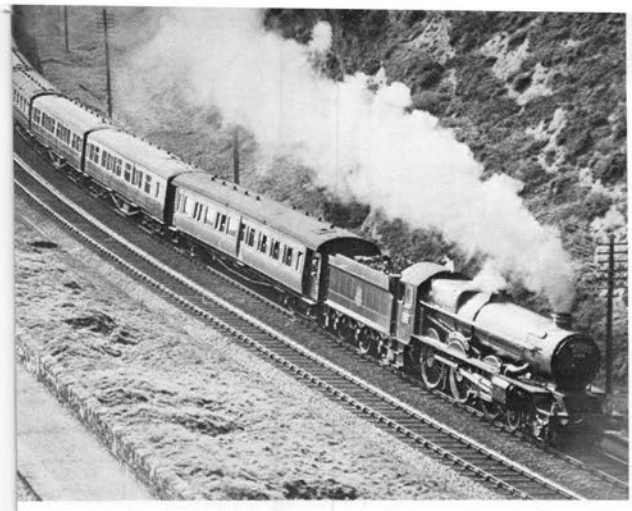
To cope with the higher power outputs made possible by the improved draughting, new front half-frames were provided for all the engines, from 1954 onwards. These incorporated new cylinders, valve gear and motion parts, and the bogie frames were strengthened. In January 1956 trouble arose with the 'King' class bogies and the entire class had to be temporarily withdrawn for rectification, with some LMR Pacifics temporarily on loan to the WR to cover the shortages. In the same year an order was placed for sets of Timken roller bearings for eight locomotives, for coupled axles, crank axles and bogies, and although these were delivered to Swindon in 1957-58 they were never fitted, because the changeover to diesel-hydraulic traction had by then brought any further expenditure on steam developments to a halt.

The final condition of the 'King' class, from 1955 until their withdrawal in 1962, was also



Top: 'King' class 4-6-0 No 6001 *King Edward VII* was selected by Swindon for trials with improved draughting, and was fitted with a longer chimney liner of smaller diameter, plus a blastpipe of reduced diameter and without the standard Churchward jumper top. The engine was thoroughly tested on the stationary plant at Swindon, and on the road with the Dynamometer car attached, as seen here. Indicator shelters were fitted to the front end for these trials, and a cage was placed over the tender coal space. Features of interest on this engine at the time included: four-row superheater (larger cowling on smokebox side); no chimney capuchon; mechanical lubricator on running plate behind the outside steam pipe; and narrow cab side window (unique to this engine.) The test train was photographed at Reading on 22 July 1951, after No 6001 had arrived six minutes early with an 18-coach load./*G. Wheeler*

Above: Experimental outside steampipes were fitted to 'King' class 4-6-0 No 6016 *King Edward V,* in the early 1950s, and from 1953 a new design was evolved with a larger radius, to eliminate a tendency for the original type to crack near the cylinder. The version seen here on No 6016, photographed on 22 February 1953, was unique to this engine and was later replaced by the new type. Note the mechanical lubricator just behind the steam pipe; four row superheater fitted, and improved draughting for single chimney, with capuchon removed. The inside valve casing was a new design, which replaced the two earlier versions and had a more angular appearance on the top, with tread-plate finish./*T. E. Williams*



their most efficient and gave them 'new wind' in no uncertain way. It was found that a side effect of the improved draughting layout in the smokebox was increased exhaust pressures and reduced power output, due to the smaller diameter of the new blastpipe. To maintain the improved draughting but avoid the increased exhaust pressure, experiments were made by S.O. Ell, with a double chimney on No 6015. Subsequently the entire class was fitted with double chimneys, self-cleaning smokeboxes and basket-type spark arresters.

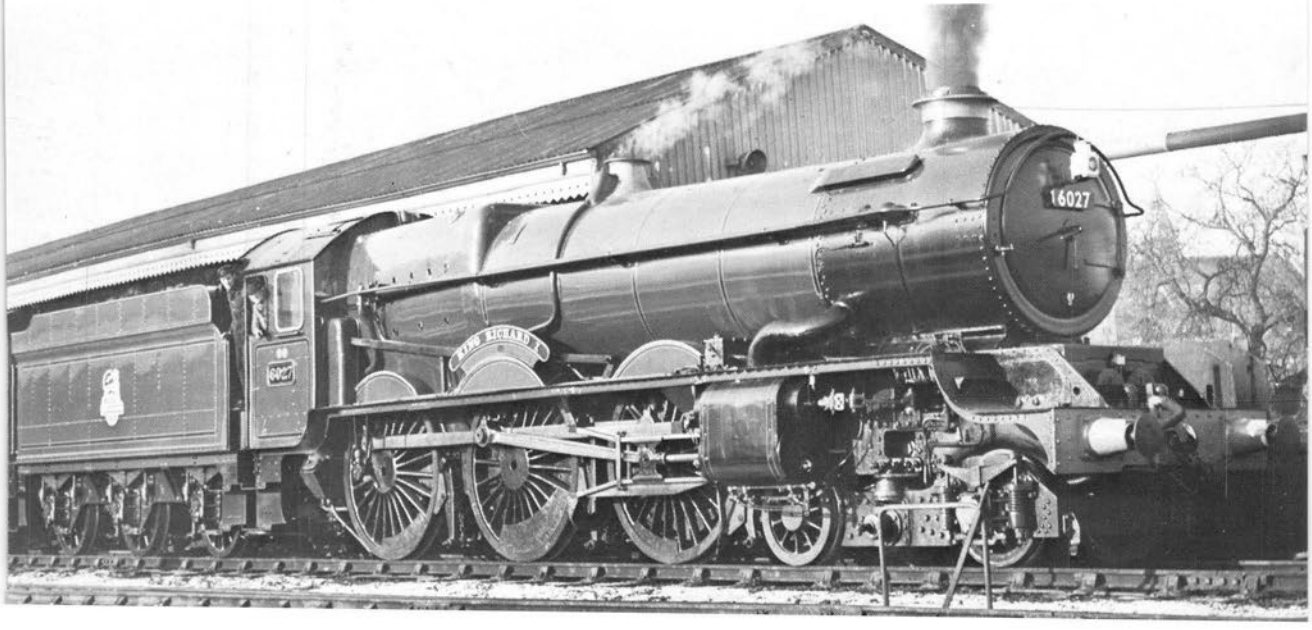
Because of their axle loading and special 'double red' route restrictions, the 'King' class did not change their pattern of work or allocation very much in the course of their careers, being mainly associated with Paddington-West of England, and Paddington-Birmingham, Wolverhampton express workings. Bristol had some for a short period, on a Bristol-Shrewsbury-Paddington-Bristol working. Late in the day, when diesel-hydraulics had displaced them from Laira, some went to Cardiff for the first time, but the bulk of their final work was on the Birmingham trains, where extra engines were needed during the period when traffic was concentrated on the former GWR route, to allow the London Midland electrification work to proceed.

Few locomotives have enjoyed such popularity, or have become legends in their own lifetime, in the way that the majestic 'Kings' did, and the design must surely be placed among the top achievements of British steam design of all time, representing the final development of Churchward's four-cylinder 4-6-0, refined and improved by his successors right up until their final years in traffic.

First of class withdrawn: 6006 (1962).
Last of class withdrawn: 6011, 6018 (1962). (1962).
Examples preserved: 6000, 6024.

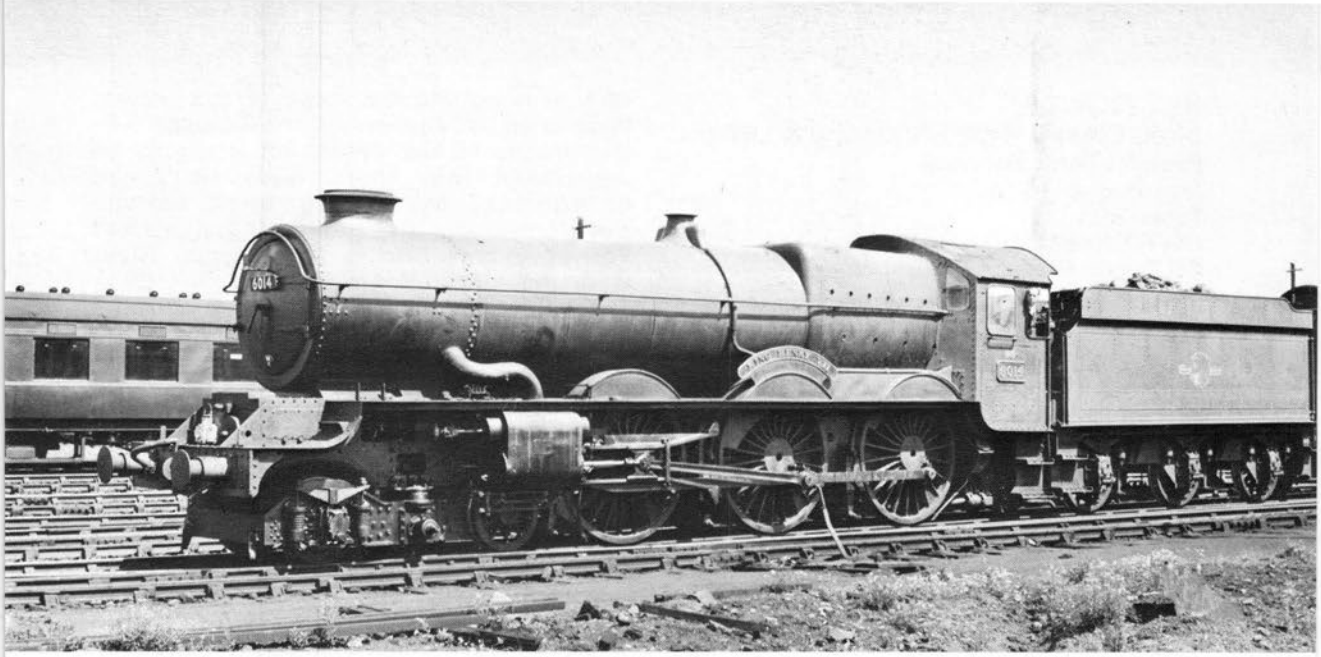
Above: 'King' class 4-6-0 No 6024 *King Edward I* makes a pleasing picture as the engine snakes round the curves at Dawlish Warren, with the 'Cornish Riviera' on 10 October 1953. The leading carriage is one of Churchward's magnificent 'Dreadnought's' of 1905, with recessed doors, as used on the 'Cornish Riviera Express' from 1905 to about 1914. */Michael E. Ware*

Below: Resplendent in BR lined green livery, and running-in after a visit to Swindon works, 'King' class 4-6-0 No 6027 *King Richard I* makes a lovely picture, standing at Bath, circa late 1954/early 1955. The engine had improved draughting for the single chimney, four-row superheater; new casing for inside valves and mechanical lubricator. A new modification (introduced from March 1954 onwards) was the provision of cab roof ventilators, as seen here, and the engine had the new type of outside steampipes fitted./*K. H. Leech*



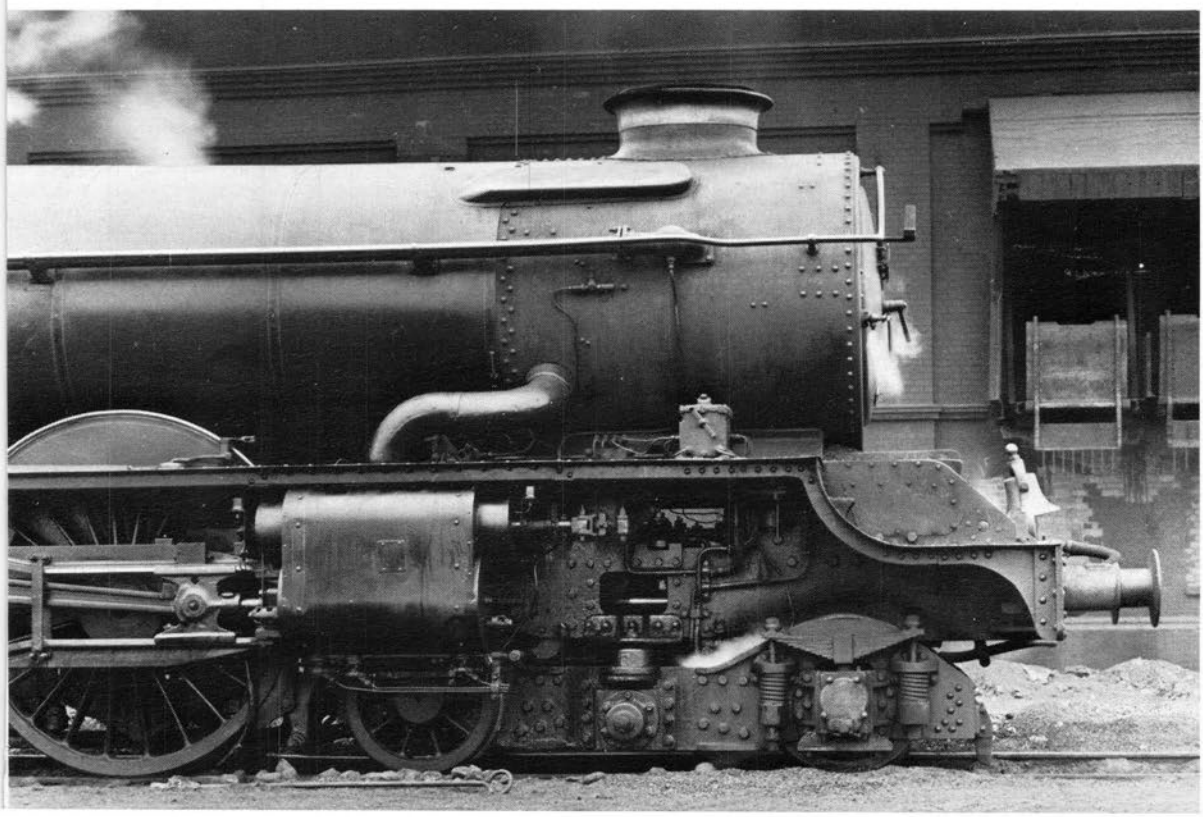
Above: In September 1955, a double blastpipe and chimney was fitted to 'King' class 4-6-0 No 6015, in order to overcome the problem of increased exhaust pressures that were found to be a feature of the improved draughting smokebox arrangement applied to the class, after trials with No 6001. The double chimney maintained the improved draughting but effectively removed the excessive exhaust pressure, which had been the cause of some loss of power output. The first double chimneys were of fabricated design, with flat parallel sides and a copper cap, and were fitted to Nos 6001/2/5-7/9-11/3/7/20/2/7 when first modified, as seen here on No 6001 *King Edward VII* photographed climbing Hatton Bank with the 11.10am Paddington-Birkenhead train on 25 January 1957. Further modification to inside valve chest casing, with a raised central portion./*T. E. Williams*

Below: Regal setting for a 'King'. Fresh from overhaul at Swindon, No 6009 *King Charles II* is seen arriving at Bath with the 5.00pm down local from Swindon; a running-in turn. The fabricated double chimneys at first fitted to the 'King' class had a rather narrow appearance, particularly viewed from head-on; as seen here. The engine had received the modified top to inside valve chest cover, and the mechanical lubricator had been moved to a position ahead of the outside steam pipes, standard for the entire class in final form./*Ivo Peters*



Above: In final form, with elegant double chimney shape, (developed after the initial experiments), 'King' class 4-6-0 No 6014 *King Henry VII* was unique in that it always retained the Vee-shaped cab front applied to the engine when it received the semi-streamlined casings in 1935 (see illustrations on pages 45-46.) The earlier double chimney was replaced by this new design, on all the engines concerned. No 6014 illustrates the new front buffers of self-contained type, which replaced the original conical type fitted, from 1959 onwards./*J. B. Bucknall*

Below: Front end of No 6000 *King George V,* photographed at Old Oak Common shed on 20 April 1961, with the engine in the final form in which it ran in BR revenue-earning service, with new buffers, mechanical lubricator ahead of outside steam pipe and elegant copper cap double chimney. This striking picture clearly shows the unique bogie design of the 'King' class and the layout of the rocking levers, through the frames from the inside to the outside cylinders. No 6000 was withdrawn for preservation in December of the following year./*M. Pope*



SECTION 5

5700 Class 0-6-0PT Shunting & Light Freight Tank Engines

Introduced: 1929
Total: 863
GWR Classification: C, Blue/Yellow*
BR Power Class: 4F

The year 1929 saw the commencement of a large-scale programme to replace the hundreds of Victorian saddle and pannier 0-6-0Ts, which were a familiar sight in virtually all parts of the GWR system. Churchward's standardisation programme had stopped short of this need, and although he was responsible for introducing the pannier tank concept, as distinct from the saddle and side tank layouts, he had not produced a standard 0-6-0PT design when he retired. It was left to Collett, and his successor Hawksworth, to answer this need and to build between them more than 1200 engines of the type, with several variations upon the theme.

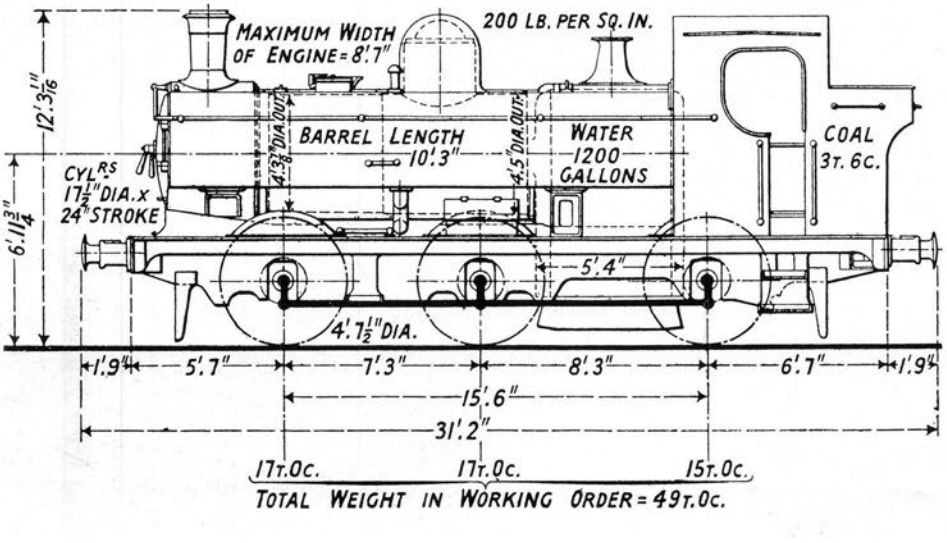
Pannier tanks are twin water carriers, attached to the boiler and leaving space above the frames for easy maintenance and routine inspection of the inside valve gear, and they did not incorporate the dome, chimney or safety valves as in the case of saddle tanks of square-topped, or rounded section. Churchward first applied the pannier tanks to a solitary 4-4-0T, No 1490, later sold out of service by the GWR; later during his tenure of office, a general policy of converting existing saddle tanks to pannier tanks was carried out (from about 1912), although some saddle tanks ran until scrapped without change of tank. It is outside the scope of this present book to go into the various pre-Grouping 0-6-0T designs in any detail, but it should be mentioned that there were six broad categories, all dating back to the Dean/Armstrong era and having a marked Wolverhampton bias in their design. These were the 1501 (of 1878,) 1701 (of 1891), 1813 (of 1882,) 1901 (of 1891,) 2021 (of 1897) and 2700 (of 1896.) classes. In 1929 140 engines of the 2021 class were still in use, and the entire 100 engines of the 2700 class remained in service, also 123 of the 1901 class. As a matter of interest, at the end of 1947 110 of the 2021, 60 of the 2700 and 43 of the 1901 classes were still in service, despite the fact that no fewer than 823 new 0-6-0PTs had been built in the interim. Moreover the 1901 class was still regarded as a standard design until replaced in 1949 by the Hawksworth 1600 class 0-6-0PTs (for light branch and shunting work)!

Collett's new standard 0-6-0PT of 1929 was the ubiquitous 5700 class and these were an up-dated continuation of the pannier tank-fitted version of the 2700 class which had last been produced 28 years earlier! The 5700 version had a higher boiler pressure of 200lb instead of 180lb, improved valve setting, larger bunker and enclosed cab and a Belpaire boiler.

The principal dimensions, as first built, were as follows: two inside cylinders of 17½in diameter by 24in stroke (set at a relatively steep angle, and fitted with slide valves actuated by Stephenson link motion) driving on to coupled wheels of 4ft 7½in diameter. The tube heating surface was 1075.7sq ft and

**Route colour changed to yellow after 1950, except for Nos 9700-9710.*

Below: 5700 class 0-6-0PT, with improved cab design. (See drawing reproduced on page 54 for earlier cab design.)



the firebox heating surface was 102.3sq ft giving a total heating surface of 1178.0sq ft. The grate area was 15.3sq ft and the boiler pressure was 200lb. Tractive effort at 85% was 22 515lb.

No prototype testing was considered necessary, and the initial order was for 100 engines, followed by a further 200 which were ordered to create work under a Government scheme to alleviate the effects of the trade depression, in 1929-31.

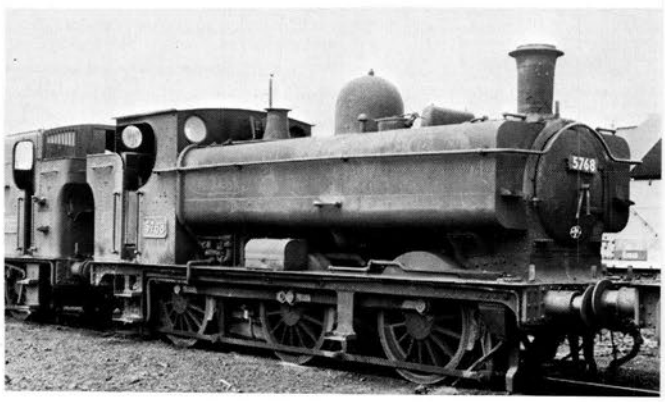
A need arose for replacement engines suitable for use over the Metropolitan electrified lines, to Smithfield. The existing types were the 633 class 0-6-0Ts and the snappy little 'Metro Tank' 0-4-2Ts, both fitted with condensing apparatus, for operations in the underground tunnels. Collett took 5700 class No 8700 and converted it to a condensing engine, in March 1932 (see drawing on page 54). Experience with No 8700 in service led to an order for ten new engines, Nos 9701-9710, specifically designed for the job. These introduced the improved cab to the 5700 class, and were modified in a number of other respects, as illustrated on pages 55-58. Later engines of the standard type, from No 8750 onwards also had the improved cab design.

The engines were built as follows:

Nos 5700-5749	North British	1929
Nos 5750-5779	Swindon	1929
Nos 5780-5799	Swindon	1929-30
Nos 6700-6724	W. G. Bagnall	1930
Nos 7700-7724	Kerr Stuart	1930
Nos 7725-7749	North British	1929-30
Nos 6725-6749	Yorkshire Engine Co.	1930-31
Nos 7775-7799	Armstrong Whitworth	1930-31

Above: 5700 class 0-6-0PT No 7713, built by Kerr Stuart at Stoke-on-Trent in 1930, and showing the original condition of the earlier batches. Based directly upon the 2700 class, the standard engines had increased boiler pressure, and enlarged bunker and an enclosed cab of surprisingly old-fashioned appearance. Non-fluted coupling rods and the arrangement of wheel springing (with underhung laminated springs on the leading two axles, and overhung volute springs on the trailing boxes) was the same as the 1854 class of 1890. The 5700s had cast iron chimneys, without a copper cap; but some had polished brass safety valve casings, as seen here. */Ian Allan Library*

Below: No 5768, of the first batch built at Swindon, in 1929, seen in BR plain black livery at Swindon after withdrawal, on 7 May 1961. Very little alteration had been made to the appearance of the engine during its career except for the addition of top feed to the boiler, and a small whistle shield. The original cab design can be compared with the later Collett version, seen on 7400 class 0-6-0PT No 7433, adjacent. */R. Wales*

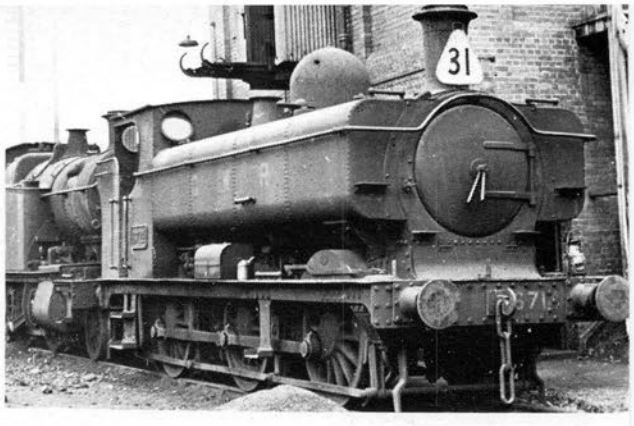


Nos 8725-8749	W. G. Bagnall	1930-31
Nos 8700*-8724	Beyer Peacock	1931
Nos 7750-7774	North British	1930-31
Nos 9701-9710	Swindon	1933
Nos 8750-8798 8700*	Swindon	1933-34
Nos 8799, 9711-9759	Swindon	1933-34
Nos 9760-9784	Swindon	1935-36
Nos 9785-9799 3700-3734	Swindon	1936-37
Nos 3735-3784	Swindon	1937-38
Nos 3785-3799 3600-3634	Swindon	1938-39
Nos 3635-3684	Swindon	1939-40
Nos 3685-3699 4600-4634	Swindon	1940-42
Nos 4635-4660	Swindon	1942-43
Nos 4661-4699 9600-9621	Swindon	1943-45
Nos 9622-9641	Swindon	1945-46
Nos 9642-9651	Swindon	1946
Nos 9652-9661 6750-6759	Swindon	1946-47
Nos 9662-9672	Swindon	1948
Nos 6760-6769	Swindon	1948-49
Nos 9673-9682	Swindon	1949
Nos 6770-6779	Swindon	1950

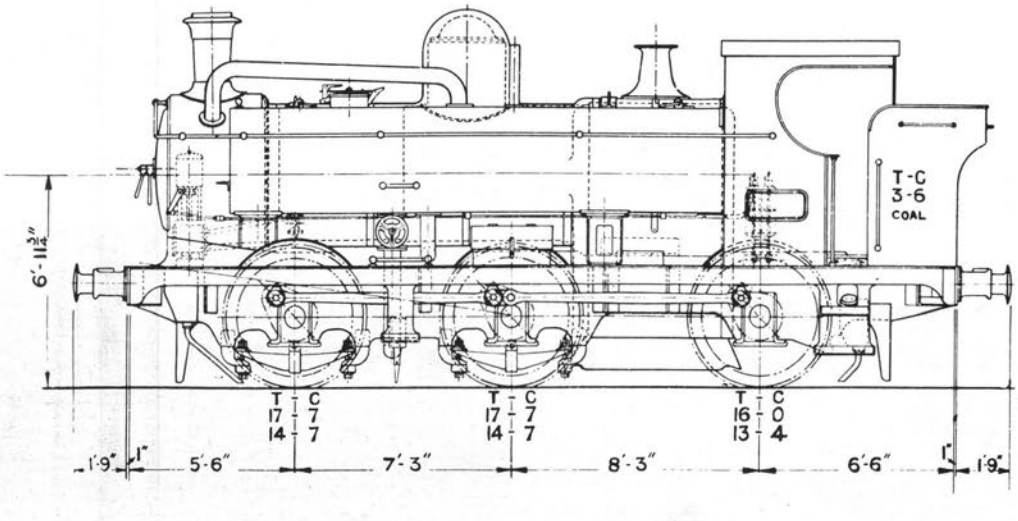
**The original No 8700 was renumbered 9700 in March 1934 and the second No 8700 received certain parts from the first.*

Except for a few areas where their axle load was too high, the 5700 class was always widely distributed over the entire system, and from 1950 onwards they had 'yellow' route availability (except Nos 9700-9710) due to the low hammer-blow effect that they were found to have upon the track. In 1954 only Truro, Abercynon, Treherbert, Aberystwyth and Machynlleth did not have examples allocated. The fact that they were built in such quantities speaks for itself; they were snappy, powerful engines, and were often grossly overloaded for their size, because they showed such wonderful free-running abilities, plus remarkable power when working at low speeds. If Hawksworth had not altered the design,to produce his 9400 class in 1947, but had built 200 more of the 5700s instead, the type would have totalled over 1000 engines (1063 to be precise) and would have been the largest single class ever built in this country.

After nationalisation, and with the introduction of BR standard diesel shunters, the class found new areas of employment, where their sturdy design was soon appreciated. The Southern Region received several, for use at Folkestone Harbour, and on Waterloo station pilot duties, and some were at London Midland sheds after adjustment of Regional boundaries (the LMR gave them a 3F



Below: 5700 class 0-6-0PT No 8700, as modified for use on the Metropolitan line to Smithfield, in March 1932, with condensing apparatus.This drawing shows the original cab fitted to the 5700 class. For this conversion the pannier tanks were cut back at the leading end, reducing their capacity to 1080gal.



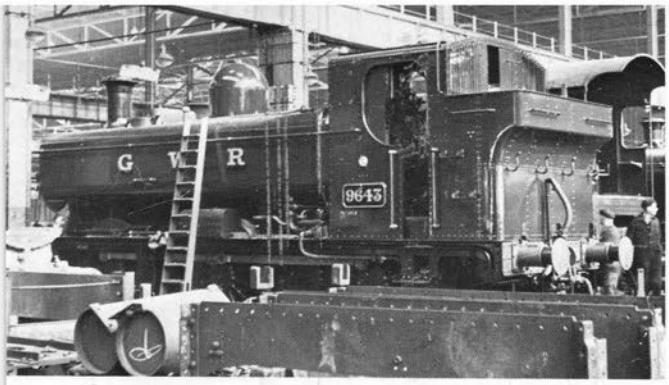
Above left: Of the batch of 200 built by outside contractors, under a Government scheme to relieve unemployment, Nos 6700-6749 built by W. G. Bagnall (6700-6724) and Yorkshire Engine Co. (6725-6749) in 1930-31, were fitted with steam brakes only, and a simple, three-link coupling, for freight shunting duties. When new, there was not much work for them, and most of this batch were stored for the first two years of their lives. No 6712 was photographed on shed at Swansea East Dock, on 6 July 1947, still carrying the sans-serif lettering GWR on the tanksides, which was introduced as a wartime livery economy./*H. C. Casserley*

Above: Prototype condensing 0-6-0PT No 8700, seen double-heading 5700 class 0-6-0PT No 5727, on a freight train at West Brompton, on the West London Extension Railway; 28 August 1933. The following year No 8700 was brought into line with the new condensing engines, and renumbered 9700. A second locomotive, No 8700 was built at Swindon in 1934, to standard 5700 class design; this utilised the cab and numberplates of the original engine./*H. C. Casserley*

Below: Ten standard 9700 series 0-6-0PTs were built at Swindon in 1933, based upon the 5700 class but modified with condensing apparatus for use on the Metropolitan line workings to Smithfield. These were Nos 9701-9710 and featured combined pannier and side tanks, with an increased water capacity of 1230gal. They also introduced the new cab design, with larger windows, rounded roof and sliding side shutters. The bunker capacity was slightly reduced, to 2tons 16cwt. The prototype, No 8700 was rebuilt to conform, and renumbered 9700. All these engines had an increased weight in full working order of 50tons 15cwt. To conform with LT regulations, Nos 9700-9710 had trip-cocks for emergency brake applications on the electrified lines, and the standard GWR ATC apparatus was modified so that it could automatically clip-up clear of the live rail when entering an electrified section, and could then be released again when leaving. /*Collection: H. C. Casserley*

power class rating). The most remarkable move was the decision taken by London Transport, to purchase spare 5700 class engines, and take them into LT stock to replace their own life-expired shunting engines. Full details of these engines with the dates of LT ownership, are as follows:

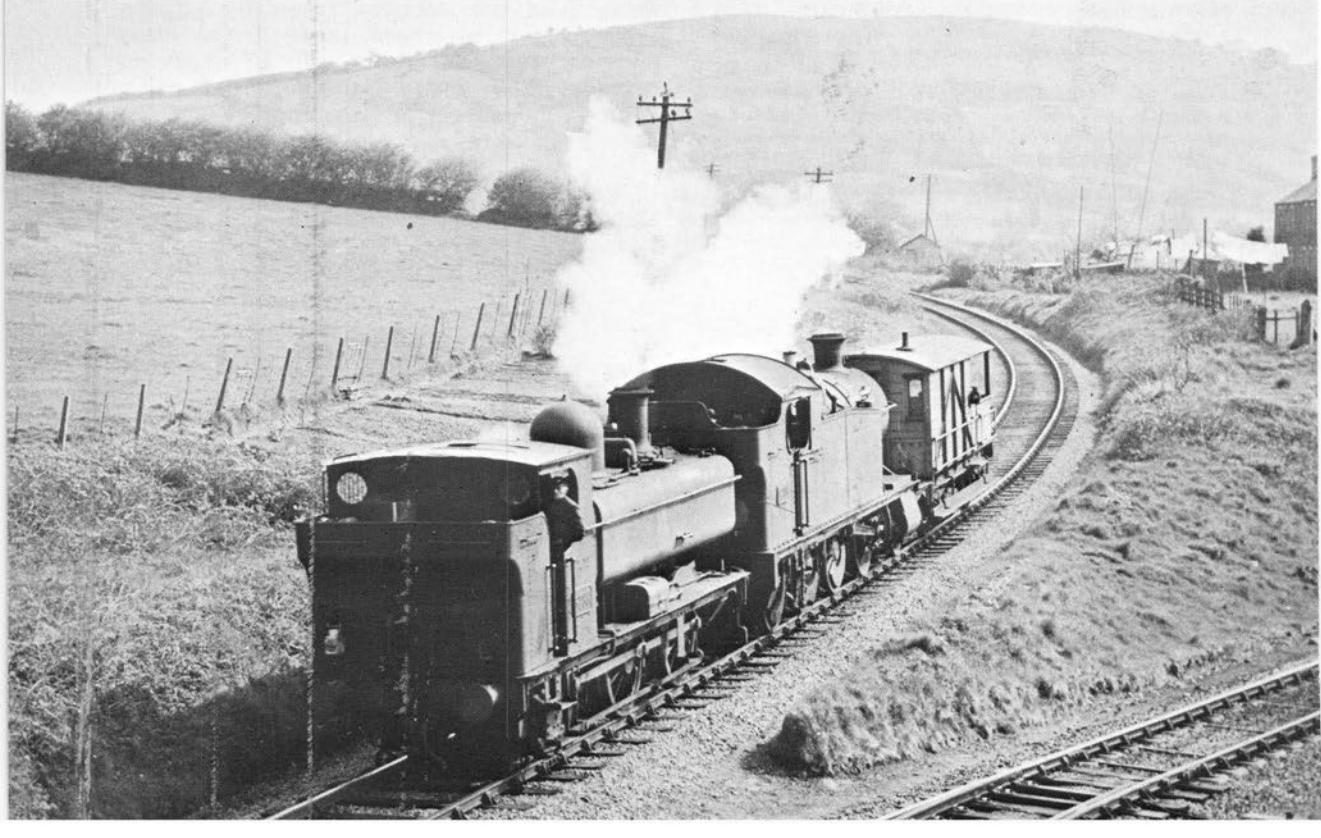
LT No L90	(ex 7711)	10/1956 — 10/1961
LT No L91	(ex 5752)	2/1957 — 11/1960
LT No L92	(ex 5786)	4/1958 — *



Top left: Construction of the 5700 class 0-6-0PTs was continued steadily all through the 1930s and the war years that followed. No 9643 was nearing completion at Swindon, on 4 April 1946, resplendent in post-war green livery, when this picture was taken. The post-war engines were built new with top feed to the boilers and had the improved cab which Collett fitted to all the engines delivered from Nos 8750 onwards. This cab had a rounded roof, large windows and sliding shutters to improve weather protection. Hawksworth continued to build the 5700s, in limited batches and although he produced his modernised 9400 version in 1947, the last 5700 was constructed in December 1950; just six years before withdrawals commenced of the earlier engines!/*H. C. Casserley*

Centre left: Early British Railways livery applied to No 9715, photographed at Oxley shed in 1949. Various styles of lettering were applied before the decision was taken to use the 'Lion and wheel' emblem for locomotives. No 9715 has the tall version of the whistle shield usually applied to 5700 class engines fitted with the later Collett cab. No top feed fitted. Although plain black was the standard BR livery for the class, a few of the engines in the 8750 series, used as station pilots at Paddington, received LNWR style lining out./*Frank F. Moss*

Below: Rear view of the original cab and bunker design used on the 5700 class 0-6-0PTs, as No 5788 leads 4200 class 2-8-0T No 4261, at Maeseraul Junction on 3 May 1958. The pair are seen on the single line Pontypridd-Llantrisant branch, returning from Cwm Colliery. The 5700 was the banker, and the 4200 was the train engine. No 5788 had received a boiler fitted with top feed, a feature first introduced to the class in 1942, and used for all new engines after 1944./*S. Rickard*

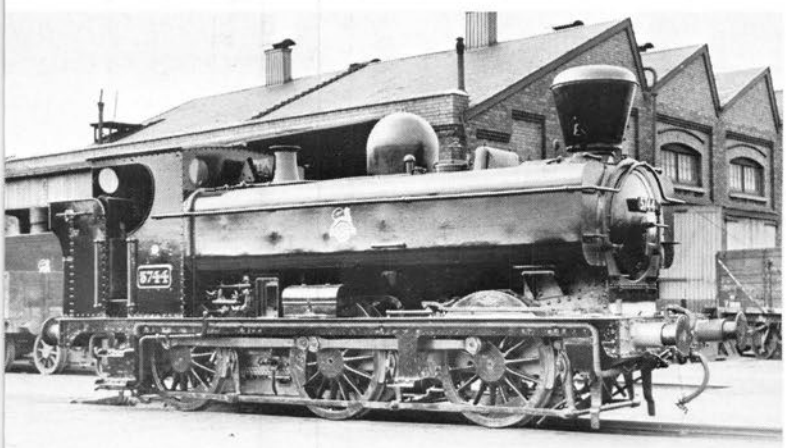


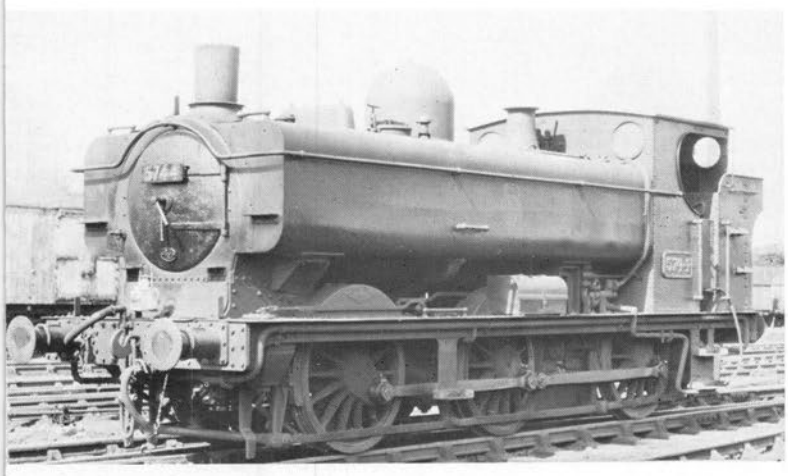
LT No L93	(ex 7779)	10/1958 — 12/1967
LT No L94	(ex 7752)	11/1959 — 6/1971
LT No L95	(ex 5764)	5/1960 — 6/1971
LT No L91†	(ex 5757)	12/1960 — 12/1967
LT No L96	(ex 7741)	12/1961 — 12/1966
LT No L90†	(ex 7760)	12/1961 — 6/1971
LT No L97	(ex 7749)	9/1962 — 9/1968
LT No L98	(ex 7739)	11/1962 — 11/1968
LT No L99	(ex 7715)	5/1963 — *
LT No L89	(ex 5775)	7/1963 — *

**Engines sold out of service for preservation; 1969-70.*
†Nos L90 and L91 were used twice; the first examples were returned to Swindon for cutting-up.

The London Transport engines were all of the original cab version of the 5700, and were painted in lined-out LTE maroon livery. The three that remained in service in 1971 were the last active steam engines in the London area, outliving their WR counterparts by six years (although three LMR-allocated engines survived until 1966.) An odd fact is that despite the class being the most numerous single type to run on the GWR, not one was purchased direct from BR stock for preservation, and all the examples preserved came from outside sources; ie scrapyards or LTE stock.

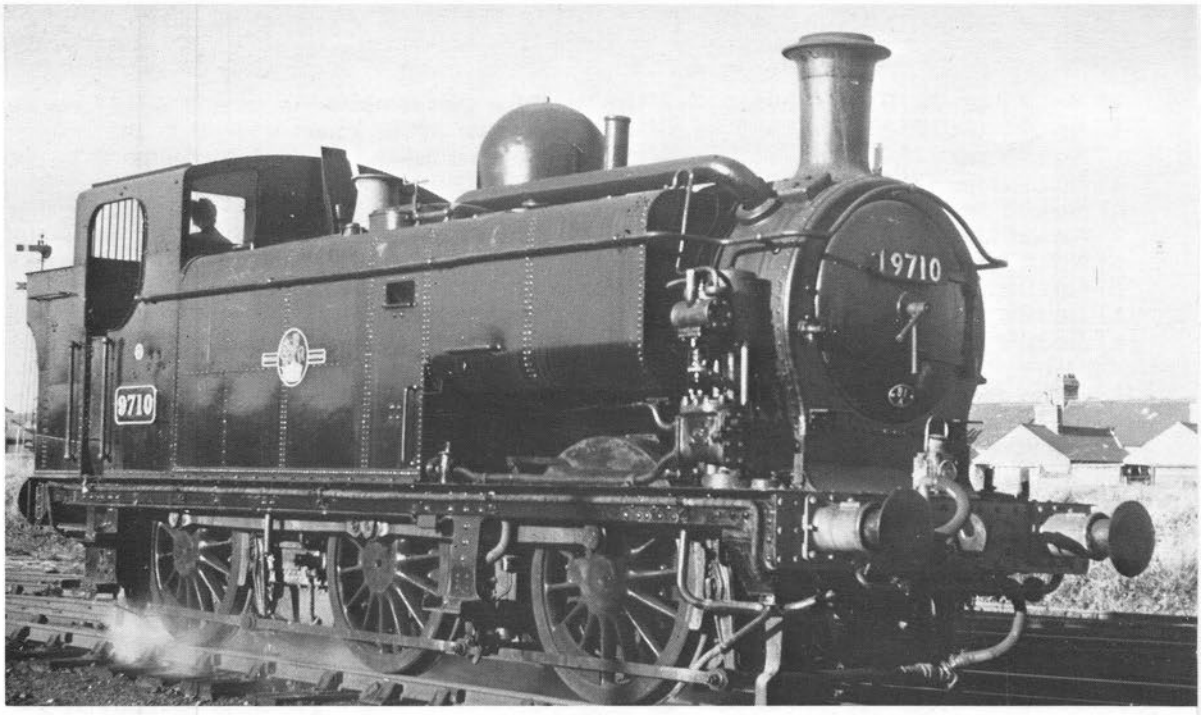
First of class withdrawn: 5700, 5762 (1956).
Last of class withdrawn (BR stock): 4646, 4696, 9774
(LT stock): L90, L94, L95 (1971).
Examples preserved: 3650, 3738, 4612, 5764(L95), 5775 (L89), 5786 (L92), 7714, 7715 (L99), 7752 (L94), 7760 (L90), 9600, 9642, 9681.





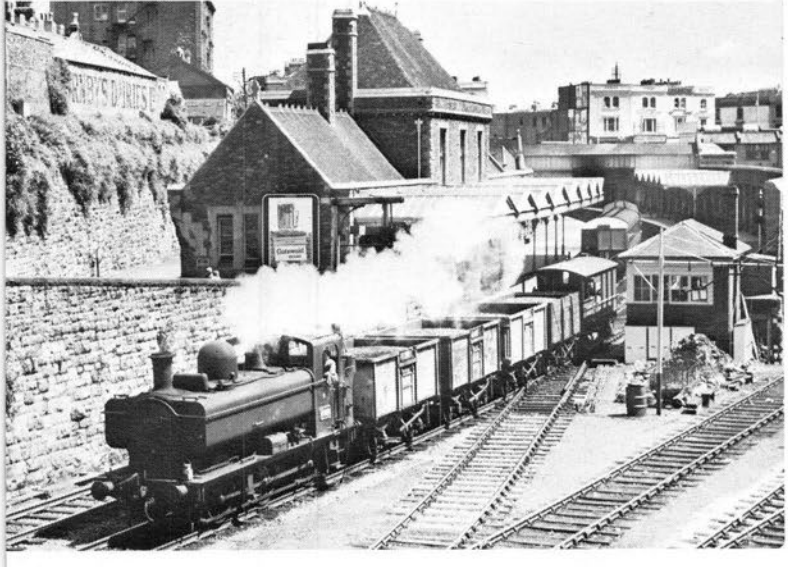
Left: Engines used in certain sidings, including Military depots, were required to carry spark arresting chimneys. During World War II, a number of 5700 class 0-6-0PTs were allocated to Didcot, and fitted accordingly. These were Nos 3709/21, 4601, 5710/44/52, 7709, 8738/57 and 9722. Fresh from overhaul at Swindon, No 5744 was photographed in November 1955, sporting the cumbersome device, and fitted with a top feed boiler. Other engines to carry spark-arresting chimneys, during WW2 included Nos 5757, 7709/13./*G. Wheeler*

Below left: Even more bizarre was the effect created by the later removal of the spark-arresting device! No 5744 is seen again, this time at Truro on 29 April 1961. The bunker had footsteps welded to the side (fireman's side only) a feature introduced from No 9795, when new in 1936, and subsequently applied to existing engines. Additional handrails were added, as seen here on No 5744, to give easier access to bunker./*R. C. Riley*



Above: Condensing 0-6-0PT No 9710, photographed on shed at Cardiff Canton, returning to Old Oak Common after overhaul at Caerphilly works, in February 1962. The series 9700-9710 were always at Old Oak, because of their special duties on the Metropolitan lines, and it was rare indeed to find one this far afield! A vertical Weir feed pump was carried on the right hand side of these engines, at the front and this feature plus the large pipes connecting the smokebox and tanks necessitated the pannier tank portion being shortened. Note the large whistle shield fitted, and the polished brass safety valve casing./*J. Hodge*

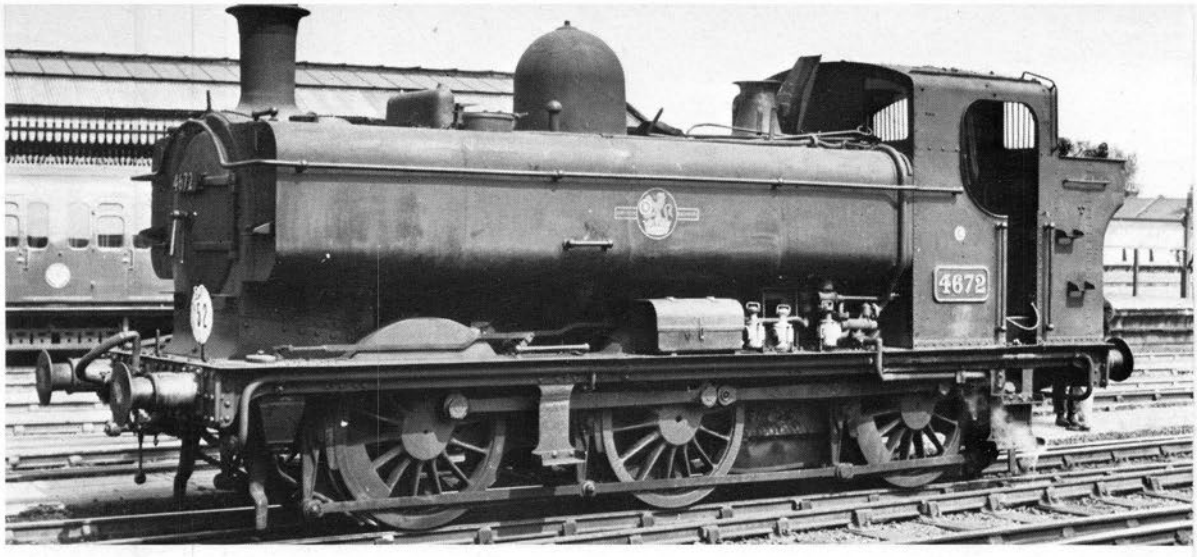
Below: Bunker-end view of 9700 class 0-6-0PT No 9701, photographed standing at West Ealing with milk wagons as 'Modified Hall' class 4-6-0 No 7910 *Hown Hall* passes on an up freight. The condensing 0-6-0PTs had a hand wheel under the bunker on the left hand side, for supplying water to the Weir pump. Steps added to bunker side by the time this picture was taken./*C. R. L. Coles*



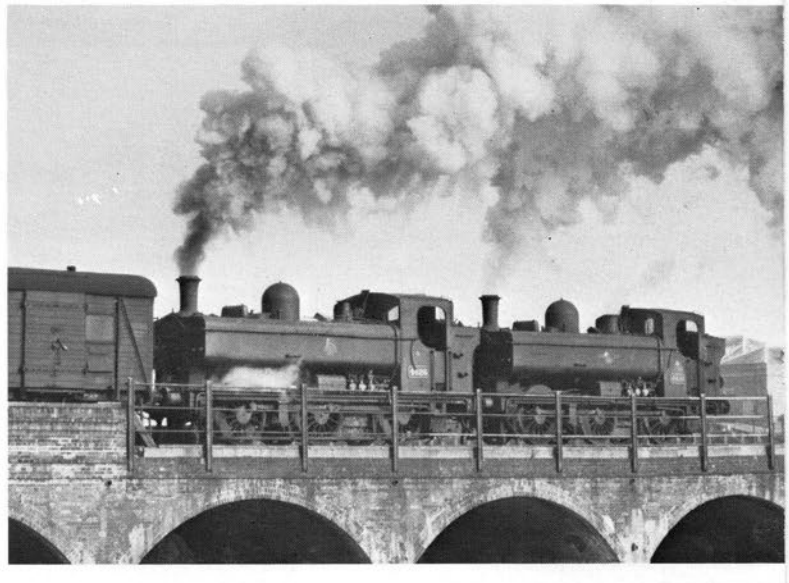
Above: Plymouth-Launceston train, composed of a vintage ex-LSWR three-coach set, photographed at Yelverton in the charge of 5700 class 0-6-0PT No 4658, on 17 April 1954; with the signalman about to exchange the single line tokens. A large proportion of the class carried vacuum brake and steam heating apparatus for use on passenger trains and empty coaching stock. They regularly performed on branch line and short main line duties, with an ability to run freely with moderate loads. Sometimes they were called upon to deputise for failed express passenger engines, with results best described as explosive!/*B. A. Butt*

Centre left: 5700 class 0-6-0PT No 4660, photographed on a light westbound freight train, passing Clifton Down station, Bristol on 7 June 1960. The engine is in the final condition of the later examples of the class, with top feed boiler, large whistle shield and footsteps added to bunker side. In the background can be seen a BR diesel railcar. Introduction of these railcars displaced the numerous GWR tank engines of 2-6-2T, 0-4-2T and 0-6-0PT types previously used for local passenger work./*S. Rickard*

Bottom left: In April 1958 No 3711 was equipped to burn oil fuel, by Robert Stephenson & Hawthorns Ltd. It ran trials at Old Oak Common and Swindon, and is seen here standing at Swindon in June 1959. Modified bunker with fuel tank inset, and sliding cabside shutter visible./*G. Wheeler*



Above: Several 5700 class 0-6-0PTs were transferred to Southern Region stock and allocated to Nine Elms and Folkestone. The Nine Elms engines were used mainly for empty coaching stock duties between Clapham Junction and Waterloo, and as station pilots at Waterloo. No 4672 was photographed, between spells of duty, in the yard at Clapham Junction. Lamp brackets were replaced by standard BR type, with two additional ones on the upper part of the front of the pannier tanks, to cater for SR headcodes. Slight modifications made included reduction in width of footsteps, overall./*Author*

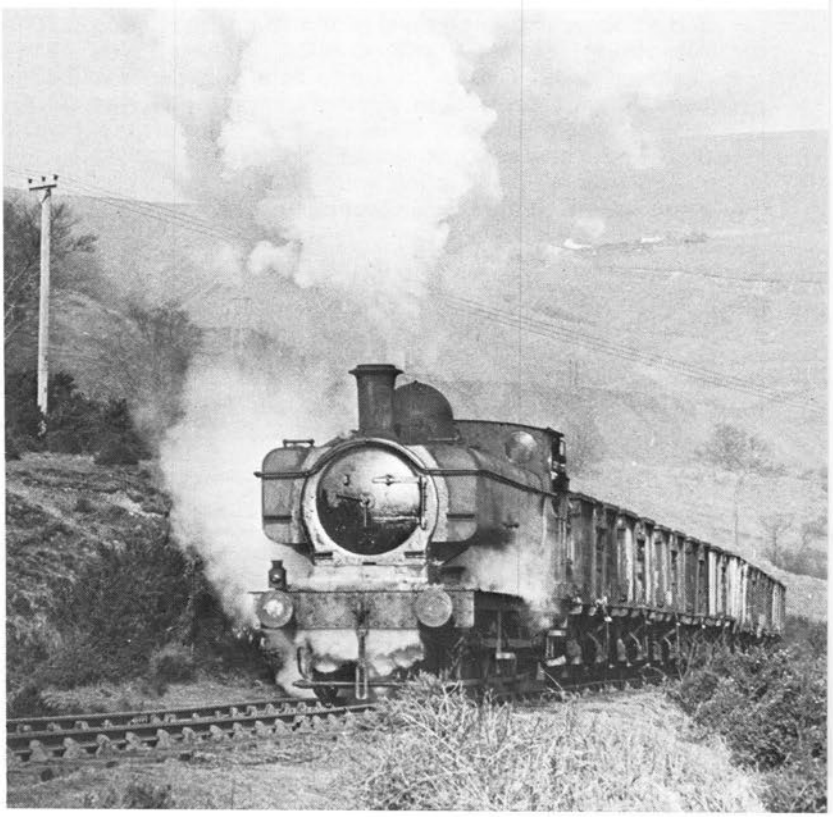


Centre right: The steep incline from Folkestone Harbour up to the main line was a constant challenge in steam days, and Nos 4626 and 4616 were obviously exerting themselves as they provided banking assistance at the rear of a Boat train seen leaving the Harbour./*P. Ransome-Wallis*

Bottom right: In October 1956 5700 class 0-6-0PT No 7711 was transferred to London Transport stock, repainted in their maroon livery and renumbered L90. In February 1957, No 5752 likewise became No L91. Between 1958 and 1963 eleven more engines were sent, and used at the LT depots at Lillie Bridge and Neasden. The original two, L90/1, were scrapped at Swindon in 1961/60 respectively, and replaced by two more, Nos 7760 (L90) and 5757 (L91.) All the LT engines were of the original cab version, but were in up-to-date condition, with top feed boilers and bunker side footsteps. Note the altered lamp brackets, to carry LT pattern oil lamps. Trip cock signalling brake apparatus was fitted, and can be seen, just ahead of the rear coupled wheels. Some engines carried brushes, to clear ice and snow from frozen electric conductor rails./*R. C. Riley*

Above: The LT pannier tanks were the last regularly used steam locomotives in the London area, and three survived in use until June 1971, including No L94, which is seen here climbing to Northwood on 7 February 1969 with the return empty tip train to Neasden yard./*John H. Bird*

Right: Five of the 5700 class 0-6-0PTs were sold out of service to the National Coal Board. Nos 3663, 7714, 7754, 9600 and 9792, and all except No 3663 survived into the early 1970s. No 7754 was sold in July 1959 for use at Windsor Colliery, and later at Mountain Ash, where it was reported to be in use in 1973. The engine is seen here, stripped of vacuum brake and steam heating apparatus hard at work with a train of coal empties, on the 1 in 30 incline from Tallywain, en route to Blaenersychan Colliery on NCB metals; 3 April 1969. /*Jeffrey S. Clough*



SECTION 6

2251 Class 0-6-0 Mixed-Traffic Engines

Introduced: 1930
Total: 120
GWR Classification: B, Yellow
BR Power Class: 3MT

With the Grouping, the GWR absorbed many miles of route, in areas such as Central Wales, where axle load restrictions prohibited the use of large locomotives. Under Churchward, the railway had developed the use of 2-6-0 and 2-8-0 locomotives for goods traffic and intermediate main line duties, and these had displaced veteran 0-6-0 goods engines of Armstrong and Dean design, which were then scrapped. As a result, by 1930 there was something of a shortage of light 0-6-0s for use on the absorbed lines. Apart from a few taken over from the Cambrian Railway and the MSWJR (rebuilt by Collett with taper boilers), the best 0-6-0s available were the fine old 'Dean Goods', and some of those were becoming due for withdrawal. Swindon had improved the 'Dean Goods' by fitting superheated Belpaire boilers, and Collett decided to use some of them as replacement power on the routes where their 'uncoloured' route availability was an advantage. To release them from their remaining main line duties, and to allow the withdrawal of the last of the Armstrong double-frame 0-6-0s, Collett designed a new class of up-to-date 0-6-0 goods engine, for use on the more important duties previously handled by the 'Dean Goods', the best of which would be retained.

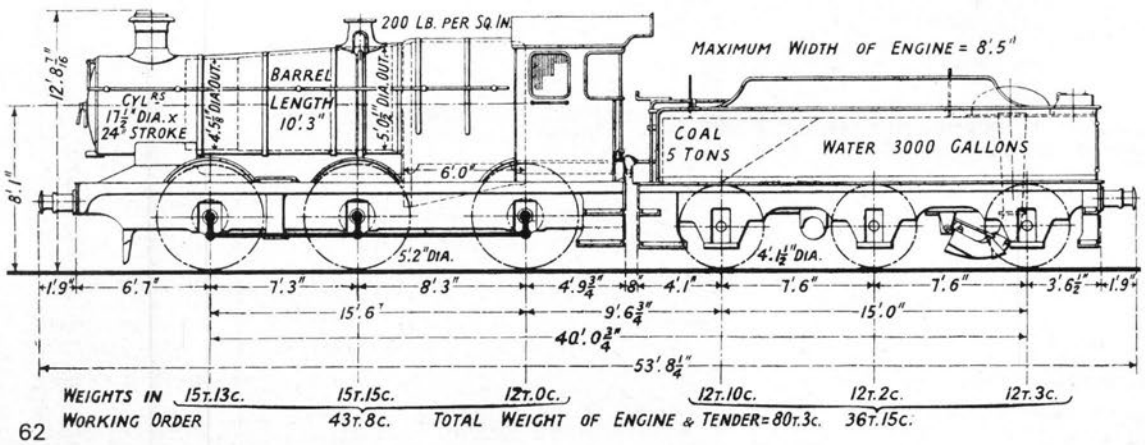
The framing and motion were virtually the same as that of the 5700 class pannier tanks, but the cylinder castings incorporated a saddle, to carry the drumhead smokebox of the standard No 10 boiler. This boiler was a modified standard No 2, and had previously been used to modernise the MSWJR 0-6-0s and certain other absorbed classes. This taper boiler was heavier than the Belpaire boiler of the 'Dean Goods', and placed the new 2251 class in the 'Yellow' route classification. The taper boiler, plus the large side window cab, gave the new 0-6-0s a most pleasing modern appearance.

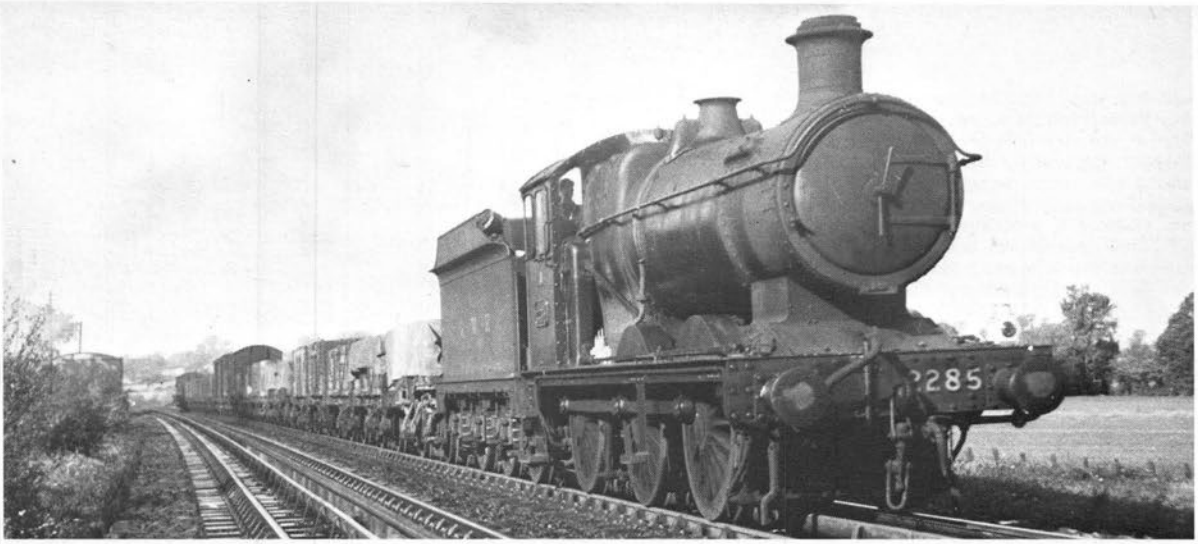
The principal dimensions were as follows: two inside cylinders of 17½in diameter by 24in stroke, driving on to coupled wheels of 5ft 2in; the tube heating surface was 1069.42sq ft, the firebox heating surface was 102.40sq ft and the superheater heating surface was 75.68sq ft, giving a combined total heating surface of 1247.50sq ft; the grate area was 17.4sq ft, and the boiler pressure was 200lb; tractive effort, at 85%, was 20 155lb. After 1945 the superheater elements were shortened, reducing the superheater heating surface to 74sq ft.

The engines were built as follows:

Nos 2251-2270	Swindon 1930
Nos 2271-2280	Swindon 1934
Nos 2281-2290	Swindon 1936
Nos 2291-2299, 2200	Swindon 1938
Nos 2201-2210	Swindon 1939
Nos 2211-2230	Swindon 1940
Nos 2231-2250	Swindon 1944-45
Nos 3200-3219	Swindon 1946-48

Below: 2251 class 0-6-0, with Churchward 3000gal tender attached.





Above: 2251 class 0-6-0s Nos 2281-2286 were built new with tenders from condemned 'Aberdare' class 2-6-0s. These 4000gal tenders had originally been attached to ROD 2-8-0s, and were of Robinson Great Central Railway design. Nos 2208/50/1/5/7/9/64/5/89 also had these tenders at various times. In this photograph No 2285 is seen passing over Ruislip troughs with a pick-up goods. Note the bucket perched high up on the tender side vane. The Robinson tender weighed 47tons 14cwt in full working order, compared to 36tons 12cwt for the 3000gal Churchward type, and 39tons 15cwt for the modern Collett 3000gal tenders, also fitted to engines of the 2251 class./*C. R. L. Coles*

Below: 2251 class 0-6-0 No 2211, photographed at the head of a westbound local train, waiting for the road at Dawlish in June 1956. Churchward 3000gal tender attached, and L-shaped handrail below side window of the cab. The first engines built had a single handrail below the window; later a second rail was placed vertically and finally the two were combined as seen here./*P. Ransome-Wallis*

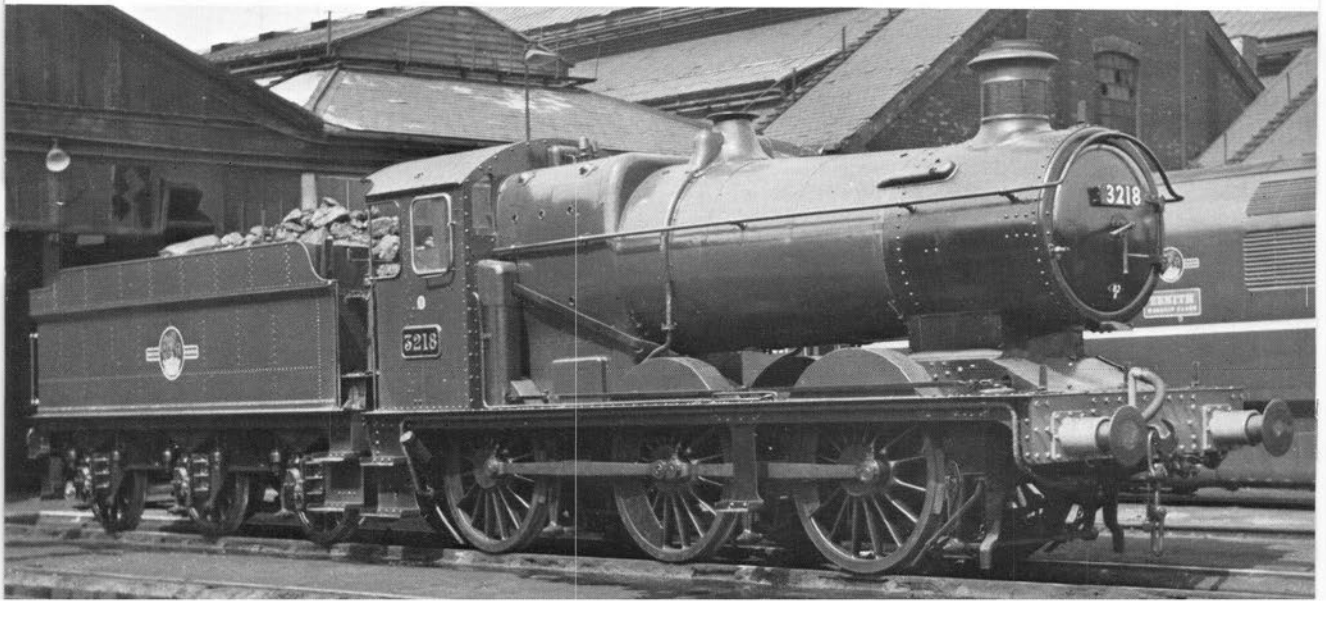
The Collett 0-6-0s proved to be versatile and popular engines, with a reputation for steadiness in running. Like their Dean forerunners, they steamed well and could run at speeds in excess of 60mph when used on light passenger turns. As the class was increased in number they took over more and more of the 'Dean Goods' turns, except where their heavier axle-load prevented them. They could be seen on main line stopping trains, as well as branch line freight and passenger work, until the closure of cross-country routes and branch lines, and the introduction of diesel railcars, displaced them.

First of class withdrawn: 2258 (1958).
Last of class withdrawn: 2210 (1965).
Example preserved: 3205.

Top right: Nos 2211-2240 were built during World War II and did not have side windows fitted to the cabs until after the end of the blackout restrictions. No 2223 was still lacking this feature when photographed at Aberystwyth on 26 August 1948. The engine was attached to a 3000gal Collett tender, with continuous fenders, and is of particular interest in that it carried a hybrid BR livery, with the lettering in GWR style Egyptian serif shaded letters, when this picture was taken./*H. C. Casserley*

Centre right: The modern look of the Collett taper-boilered 2251 class 0-6-0 seemed ill-suited to the diminutive 3000gal tender, of Churchward origin, with which some ran. No 3200, in a fresh coat of plain black BR livery, somehow emphasised this aspect, as it stood on shed at Oswestry on 29 August 1954. The engine had the steam heating hose removed from the front buffer beam for the summer months. Note that the top lamp bracket was on the smokebox top on this class, and many engines did not have a whistle shield fitted./*John K. Morton*

Below: The Collett tender, with continuous side fenders, was much more suited to the overall appearance of the 2251 class, as seen in this ex-works study of No 3218 taken at Swindon in August 1962. The engine is in plain green BR livery, although many engines received fully lined green in the later years of WR steam. No 3218 had the distinction of being the first engine to be built at Swindon under BR ownership, being delivered to traffic in January 1948. Note the prominent filler for the sandbox to the rear coupled wheels; Nos 3200-3219 were built with sanding gear to the rear wheels. /*H. W. Wheeler*



Above: 2251 class 0-6-0 goods engine No 2286 on stand-by duties, with a large snowplough attached, at Hereford shed on 3 February 1963. Standard Collett 4000gal tender alongside. Withdrawals of the 2251 class commenced in December 1958 and ended in June 1965, by which time many of the routes they had been associated with, were either closed, or had been taken over by diesels./*D. H. Cape*

Below: In fully lined BR passenger green livery, 2251 class 0-6-0 No 3210 makes a pleasing picture at the head of the 3.20pm Bath-Templecombe train, on 31 August 1961, seen leaving Binegar. Many engines received the lined green livery after 1957. No 3210 was one of the final batch of engines built, appearing from Swindon on the very eve of nationalisation. /*J. C. Beckett*

SECTION 7

5400 Class 0-6-0PT Light Passenger Tank Engines

Introduced: 1931
Total: 25
GWR Classification: Ungrouped, Yellow
BR Power Class: 1P

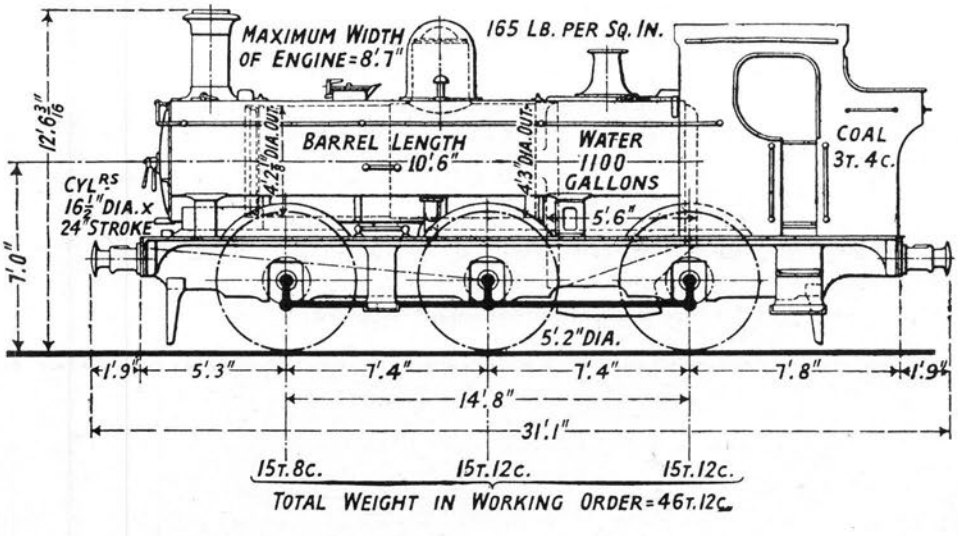
The auto-train, or push-pull, was an important feature of GWR passenger working. The maximum load of four trailers (with the engine in the middle) was dictated by the mechanical link operating the engine regulator, from the vestibule of the leading trailer. These auto-trains ran to very smart timings, on some routes, and by 1930 there was a desperate need to do something about replacing the aged 0-6-0PTs, which had been auto-fitted quite late in life, for use on these turns.

Collett gave a great deal of thought to the problem of what type of locomotive he should introduce, to replace these 0-6-0PTs (which had started life as shunting engines.) He was anxious to have a good-riding engine, not too large, but capable of good acceleration and speeds with up to four trailers, and he was keen to have guiding wheels, to assist in smooth running, on them. As previously stated some of the auto-train workings were quite smartly timed and the existing engines were called upon to operate at a good speed, over routes with quite severe curvature, whilst both hauling or propelling their stock. Before settling for modern 0-6-0PTs, he and his design staff considered 2-4-0T, 0-4-2T, 2-4-2T, 2-6-2T, and even 4-4-4T and 4-6-4T wheel arrangements. Various objections, such as increased construction costs, lack of adhesion when low on fuel, and excessive size and weight, brought the proposals back to square one, and Collett opted for up-to-date versions of 0-6-0PTs and 0-4-2Ts (see page 73) for auto-train duties. He thus took the Churchward standardisation scheme a stage further, by adding these engines to the list, with many standard components in common, and his policy was continued by Hawksworth when he introduced the 1600 class 0-6-0PT for light shunting duties, as late as 1949.

Thus the period 1930-1934 witnessed a quite remarkable revival of engine designs first produced some 50 or 60 years earlier, with a thorough up-dating by Collett!

First candidate was the auto-train 0-6-0PT, and before the requirement was finalised for production, Collett selected an existing engine as a guinea-pig, to try out the idea of fitting larger driving wheels. This was 0-6-0ST No 2080, of the Armstrong 2021 class, which was rebuilt in 1930 with 5ft 2in wheels in place of the original 4ft 1½in. The existing cylinders, motion, boiler and smokebox were retained, but pannier tanks were fitted in place of the saddle tank. The engine was tried out on extensive running tests and found to be basically successful. Next came a more extensive conversion of a 2021 class engine, No 2062, in order to gain running experience

Below: Standard 5400 class 0-6-0PT, light passenger engine.



ahead of the production batch of new engines, which were ordered at the same time. No 2062 was taken into Swindon Works and rebuilt with 16½in by 24in inside cylinders of new design, with slide valves, and a drumhead smokebox supported upon a saddle; cast steel crossheads for three-bar motion (based on the design introduced for the 5600 class, only smaller); standard No 21 boiler, and pannier tanks. The engine was renumbered 5400, and appeared in August 1930. The production batch, of completely new engines, started to appear in November 1931. No 5400 was recalled to Swindon, and again rebuilt, with new frames and Collett cab and added to stock as a *new* engine, to replace the conversion and to bring it into line with the rest of the class. To achieve this an extra set of components had been ordered at the outset, and those not used in the original conversion had been stored, it was therefore a simple matter to replace old with new when No 5400 was first called-in for repairs in June 1932.

The principal dimensions of the 5400 class, in final production form, were as follows: two cylinders 16½in diameter by 24in stroke, driving on to coupled wheels of 5ft 2in diameter. Tube heating surface of 1004.2sq ft and firebox heating surface of 81.8sq ft, giving a total heating surface of 1086.0sq ft; grate area was 16.76sq ft, and the boiler pressure was 165lb; tractive effort at 85% was 14 780lb. All the engines were auto-fitted, and all had received ATC by 1934.

The engines were built as follows:

No	5400 (ex 2062)	Swindon	1930*
Nos	5401-5419, 5400*	Swindon	1931-32
Nos	5420-5424	Swindon	1935

**The twentieth engine of this batch was turned out as the new No 5400 (using the new components from the rebuild) and it was not officially added to stock. The original parts of No 5400 were scrapped, but the engine was not officially condemned, as it was considered to be a renewal of parts.*

The 5400 class proved to be fast and useful engines on the heavier of the auto-train services and some two thirds of the class were allocated to Southall shed for these duties, for nearly twenty years. Others were at Westbury and Banbury. When the LT electrified service was extended to Ruislip, some of the London-based 5400 class were displaced, and they were then more widely distributed; including areas such as Oswestry, Carmarthen and Yeovil.

First of class withdrawn: 5408 (1956).
Last of class withdrawn: 5410, 5420 (1963).
None preserved.

Below: 5400 class 0-6-0PT No 5419, in original condition: photographed sandwiched between two auto-train trailers. The pannier tanks of the production engines held 100gal less than the prototype engine, with redistributed weights. Note the large splashers needed to house the 5ft 2in coupled wheels above the running-plate, and Collett-style cab, flush with bunker and side tanks, and with large cab windows. No whistle shield fitted until 1938 onwards./*Ian Allan Library*

Above: In post-war condition, with top feed added to the boiler, steps welded to the bunker on the fireman's side, and large whistle shield in front of cab. No 5409 was photographed near Hayes with an Ealing-West Drayton auto-train working. Special headcode carried above right-hand buffer. */E. R. Wethersett*

Below: 5400 class 0-6-0PT No 5422, seen leaving Charlton Mackrell with the single-coach 11.55am Taunton-Castle Cary train on 12 September 1952. Withdrawals began in 1957 when closure of branch lines and the introduction of diesel railcars affected the auto-train workings on the Western Region. Survivors in the late 1950/early 1960 period were painted in fully-lined passenger green livery. The last regular duty for the class was on the Yeovil Town-Yeovil Junction shuttle, and Nos 5410/20 survived for this purpose until October 1963./*R. H. G. Simpson*

SECTION 8

6400/7400* Class 0-6-0PT Light Passenger Tank Engines

Introduced: 1932/36*
Total: 90
GWR Classification: A, Yellow
BR Power Class: 2P/2F*

Once the prototype 5400 class engine had proved itself in everyday service, Collett proceeded to modify the basic design to make it more suitable for use on the more steeply graded routes, such as existed in South Wales. To test his idea of using smaller coupled wheels, Collett again took the old 2021 class engine No 2062, and used it as a guinea-pig, fitting it with 4ft 7½in wheels in November 1930. Ten new engines were then ordered, basically similar to the production series 5400s, but with the smaller coupled wheels, as part of the same lot as Nos 5401-5419; these were numbered 6400-6409.

The principal dimensions of the 6400 class were as follows: two cylinders 16½in diameter by 24in stroke driving on to coupled wheels of 4ft 7½in diameter. The standard No 21 boiler had a tube heating surface of 1004.2sq ft and a firebox heating surface of 81.8sq ft, giving a total of 1086.0sq ft. Grate area was 16.76sq ft, and the boiler pressure was 165lb. Tractive effort at 85%, was 16 510lb.

Forty engines of the 6400 class were built, all fitted for auto-train working. For use on other duties a variant known as the 7400 class was introduced, with the boiler pressure increased to 180lb, which raised the tractive effort to 18 010lb. In practically every other respect, they were identical to the 6400s, but were somewhat stronger engines. They were not fitted for auto-train working.

Non auto-train version.

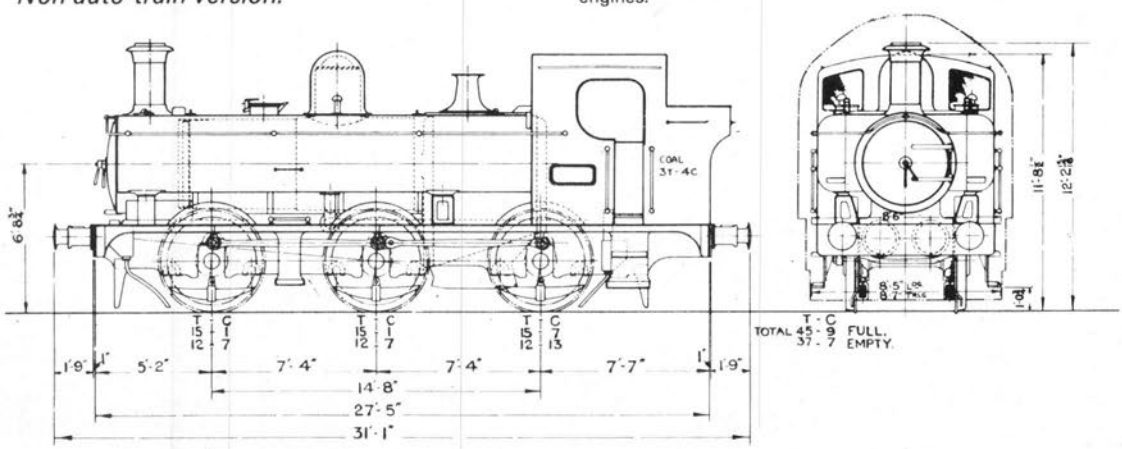
The engines were built as follows:

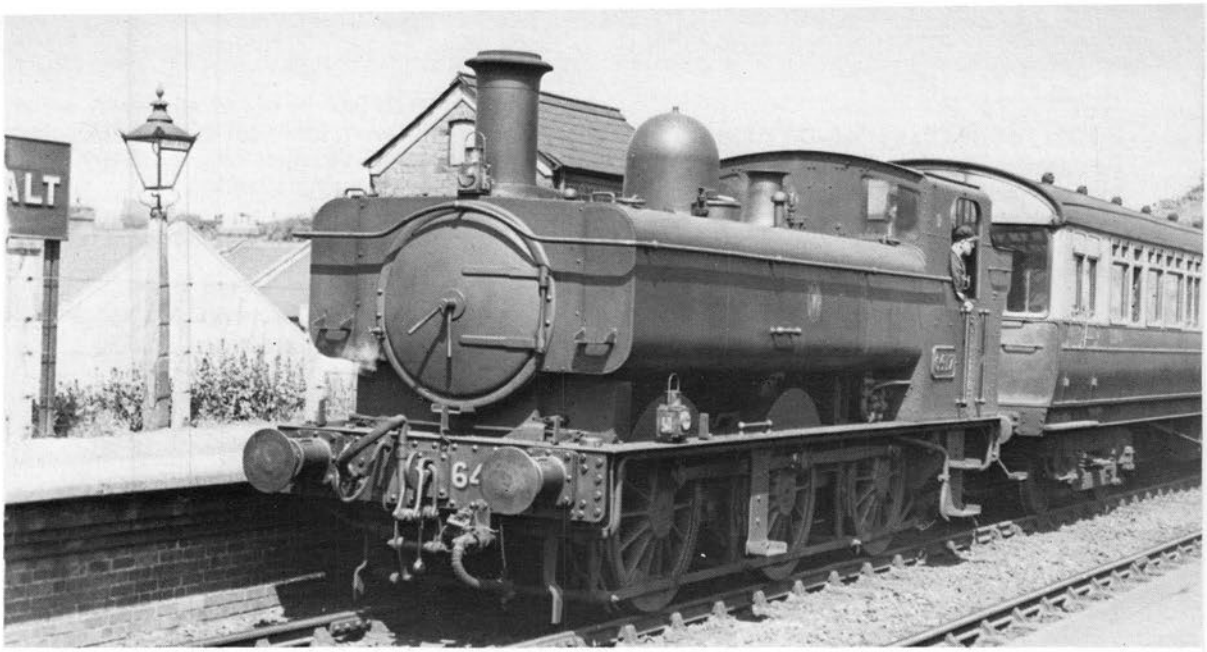
Nos 6400-6409	Swindon	1932
Nos 6410-6424	Swindon	1934-35
Nos 6425-6429	Swindon	1935
Nos 6430-6439	Swindon	1937
Nos 7400-7429	Swindon	1936-37
Nos 7430-7439	Swindon	1948
Nos 7440-7449	Swindon	1950

As can be seen from the above, batches of the 7400 series were constructed after nationalisation. These were built with top feed to the boilers, and earlier engines received this feature from about 1943 onwards. The 6400 class went mainly to South Wales, with some at Laira, Kidderminster, Stourbridge and Wolverhampton Stafford Road. The 7400 class were more widely distributed, and not being intended for auto-train use, they were to be seen on a variety of branch line duties, from passenger and freight, to milk traffic; also shunting and station pilot duties.

First of class withdrawn: 6407, 6423, 6427 (1958).
Last of class withdrawn: 7439 (1965).
Examples preserved: 6412, 6430, 6435.

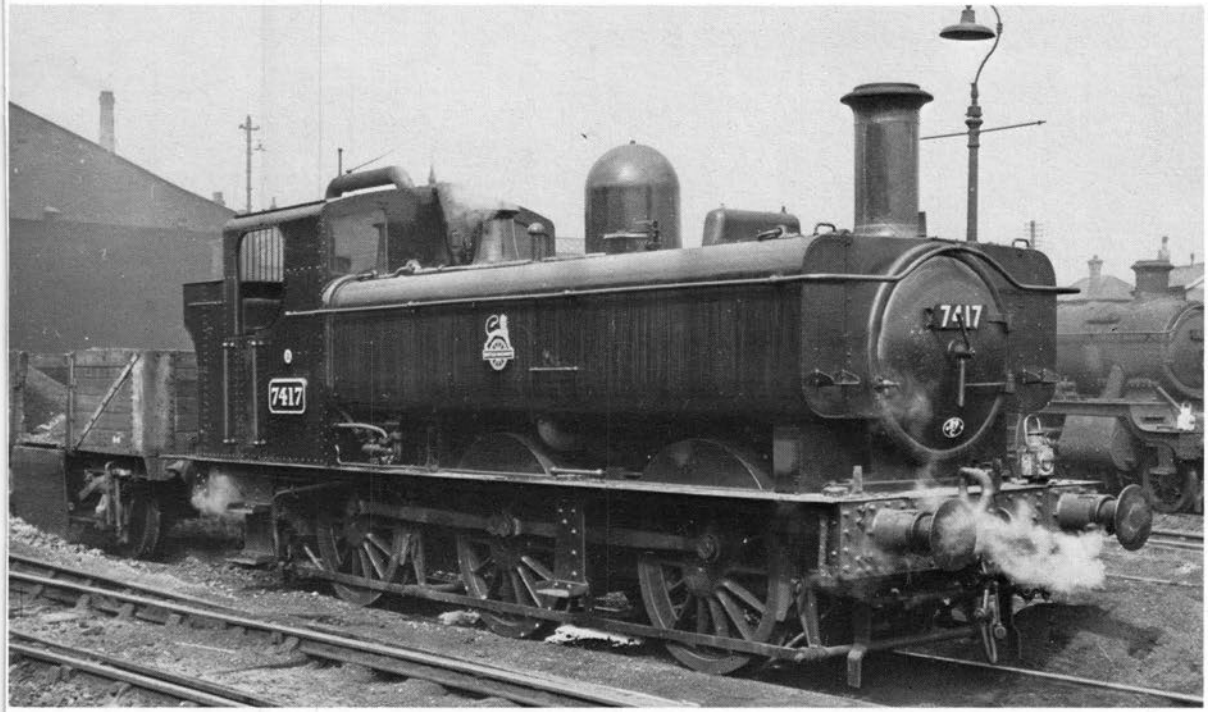
Below: 7400 class 0-6-0PT, with 4ft 7½in coupled wheels and 180lb boiler pressure. The 6400 class were identical except that they had a lower boiler pressure of 165lb, and they were fitted with auto-train apparatus. The 7400 series were non-auto engines.





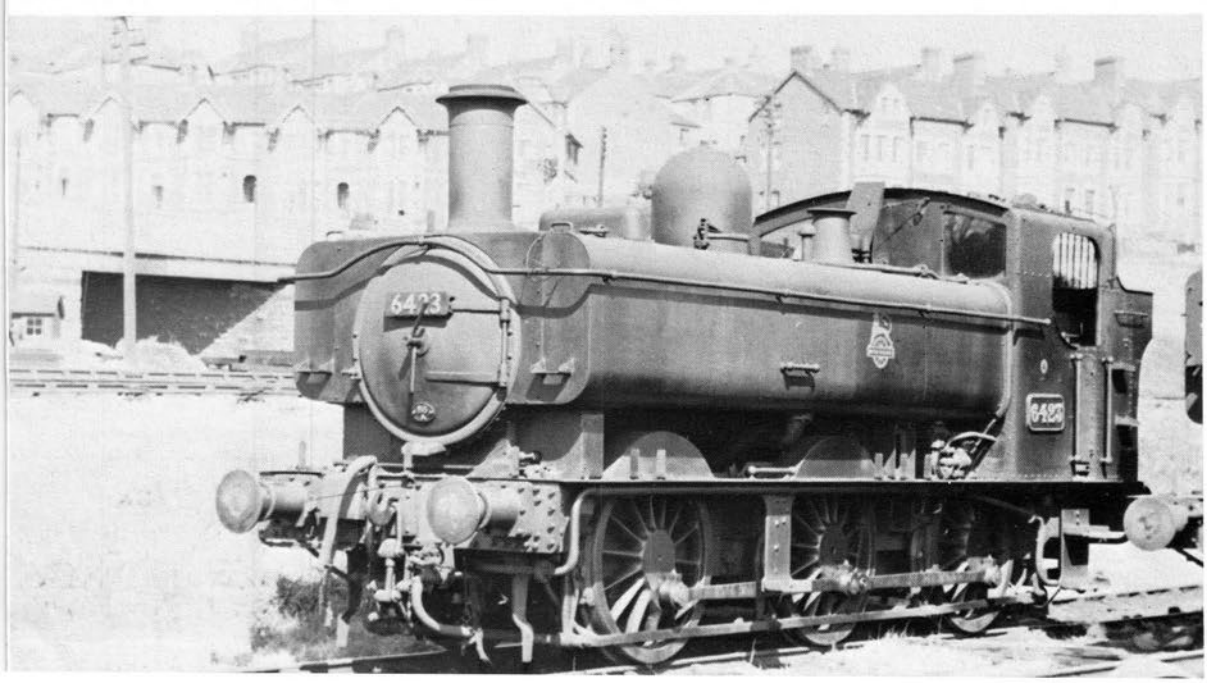
Above: Auto-fitted 0-6-0PT No 6417, photographed at Ford Halt on 23 May 1935, still in original condition, without whistle shield and with small GWR roundel transfer on tank side. Except for the smaller coupled wheels the 6400/7400 class were basically similar to the 5400 class./*H. C. Casserley*

Below: 6400 class 0-6-0PT No 6403, photographed in BR black livery, at King Sutton in 1960. The engine still carried a boiler without top feed apparatus, at this late date, and had scarcely altered in appearance since it was built, except for the addition of a large whistle shield. The auto-train trailer car is of interest, it is No W220W built as late as 1951, and named *Wren* and one of a series of new auto-train cars which it was intended to call the 'Bird' class, although only two ever received names; the other was W221W *Thrush./P. Ransome-Wallis*



Above: The non-auto variant was identical to the 6400 class, except for an increased boiler pressure of 180lb and raised tractive effort of 18 010lb. 7400 class 0-6-0PT No 7417 was photographed at Stafford Road shed on 29 April 1956, in clean BR black livery. The engine has top feed on the boiler, and a large whistle shield. A feature of the 7400 series was the square join of the top of the bunker to the back of the cab. This was rounded-off on the 5400/6400 classes./*R. J. Farr*

Below: 6400 class 0-6-0PT No 6423, photographed at a late stage in the class career, with top feed added to the boiler, footsteps welded to the bunker side (fireman's side only) and large whistle shield in front of the cab. This was one of the first three engines of the class to be withdrawn, in August 1958. A few survived until 1965, but the type of duties for which they were intended was affected by dieselisation and branch line closure./*R. Goult*



Above: 7400 class 0-6-0PT No 7440, built as late as 1950, after the retirement of Mr Hawksworth, when a final batch of 10 was delivered from Swindon. These had very short careers indeed, with No 7447 lasting only 9 years, and the majority lasting 13-14 years. No 7440 was photographed leaving Berwyn station with a train for Llangollen on 19 April 1955./*M. R. Galley*

SECTION 9

4800 (Later 1400)/5800* Class 0-4-2T Light Passenger Tank Engines

Introduced: 1932/33*
Total: 95
GWR Classification: Ungrouped/Uncoloured
BR Power Class: 1P

The most delightful product of Collett's small-engine policy of building modernised versions of life-expired existing designs, was without doubt his 0-4-2T, introduced primarily for light auto-train working and reviving George Armstrong's Wolverhampton-built 517 class, as modified with outside bearings to the trailing wheels. In 1923, one of these engines, No 1421, had been given a domeless Belpaire boiler, a weatherboard for the open-back cab, and had been tried out on Cardiff area auto-train duties. Collett's new engine, which first appeared in 1932, was outwardly similar to its aged forerunners in their later rebuilt form — but there the similarity ended! They were modern and efficient little machines, with numerous components standardised in common with the 5400 and 6400 series of 0-6-0PTs. They had the large enclosed cab favoured by Collett for his tank engines, and if their overall appearance could fairly be described as 'pretty', nevertheless they could display a smartness in performance, and turn of speed, which their looks belied. The framing, and narrow valance, was reminiscent of the Wolverhampton engines, but the wider cab, flush with side tanks and bunker, gave a more modern look to the rear of the engine and allowed very large cab windows to be fitted.

Two distinct series were introduced; the 4800 class which all had auto-train gear and ATC apparatus, and the 5800 class which had neither (later most received ATC.) The principal dimensions for both classes were as follows: two cylinders of 16in diameter by 24in stroke driving on to coupled wheels of 5ft 2in; tube heating surface of 869.8sq ft; firebox heating surface of 83.2sq ft, giving a total heating surface of 953.0sq ft; the grate area was 12.8sq ft; boiler pressure was 165lb, and tractive effort, at 85% was 13 900lb.

The engines were built as follows:

Nos 4800-4829	Swindon	1932-33
Nos 5800-5819	Swindon	1933
Nos 4830-4859	Swindon	1934-35
Nos 4860-4874*	Swindon	1936

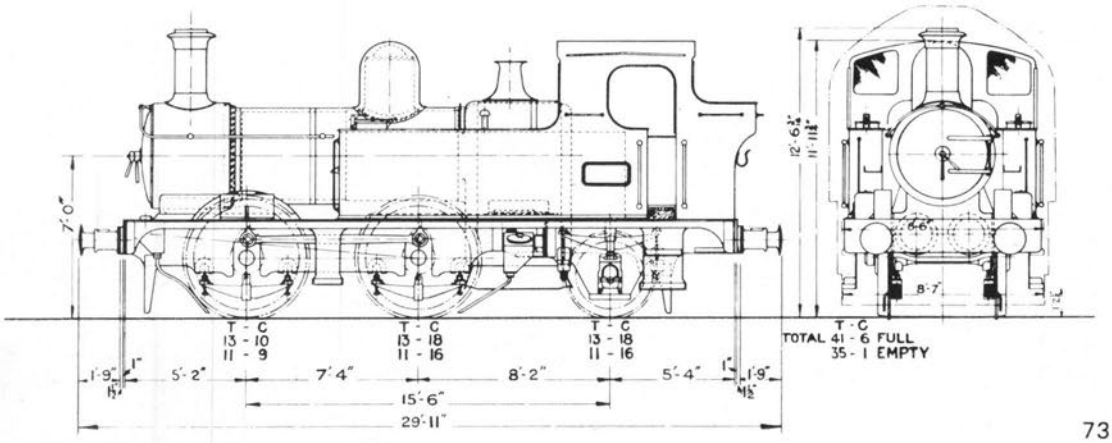
**Nos 4860-4874 were originally ordered as Nos 5820-5834 without auto-train apparatus, but the order was changed before construction commenced.*

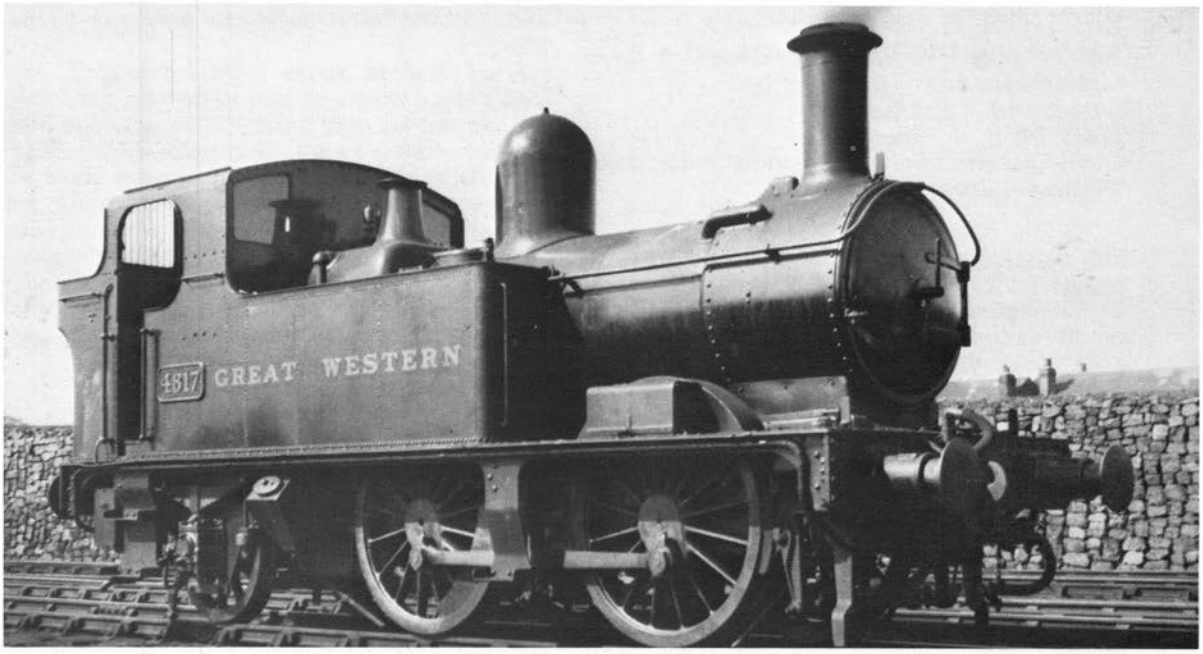
When numbers in the 4800 series were required for 2-8-0 tender engines in the 2800 class which had been converted to oil-burners, in 1946, the 0-4-2Ts Nos 4800-4874 were renumbered 1400-1474 respectively.

These popular little engines were obvious candidates for preservation, on account of their size, and the fact that they had years of useful life left in them when withdrawn from

**Non-auto fitted engines*

Below: 4800 and 5800 class 0-4-2T.





service, which was due to the closure of the majority of branch lines they worked, and the introduction of BR diesel railcars for main line services previously worked by auto-trains.

First of class withdrawn: (1400) 1425, 1460 (1956).
(5800) 5808 (1957).
Last of class withdrawn: (1400) 1453, 1458, 1472 (1964).
(5800) 5815 (1961).
Examples preserved: 1420, 1442, 1450, 1466.

Above: 4800 class 0-4-2T No 4817, in pre-war GWR livery of plain green. The small casing just behind the chimney housed the control cock for the regulator lubricator. The maximum axle load was only 13.9tons and the total weight in working order was 41tons 6cwt, which allowed the engines to run on 'uncoloured' routes. Modern constructional features included a crosshead with three slidebars; a drumhead smokebox carried in a saddle; screw reversing gear and an up-to-date enclosed cab. Nevertheless their ancestry was easily traceable to the Armstrong 517 class, from which they were derived, and whose duties they were intended to replace./*P. Ransome-Wallis*

Below left: Looking for all the world like something out of the Victorian era, but actually the product of Swindon in the 1930s! Collett 0-4-2T, and vintage stock, in a delightful setting on the Culm Valley line, with a train from Tiverton Junction to Culmstock, circa 1937-38. The outward appearance of the 4800/5800 class did much to preserve the rural aspect of many GWR branch lines, but they were smart runners and very efficient machines, capable of quickly dispelling any illusions of antiquity./*B. K. Cooper*

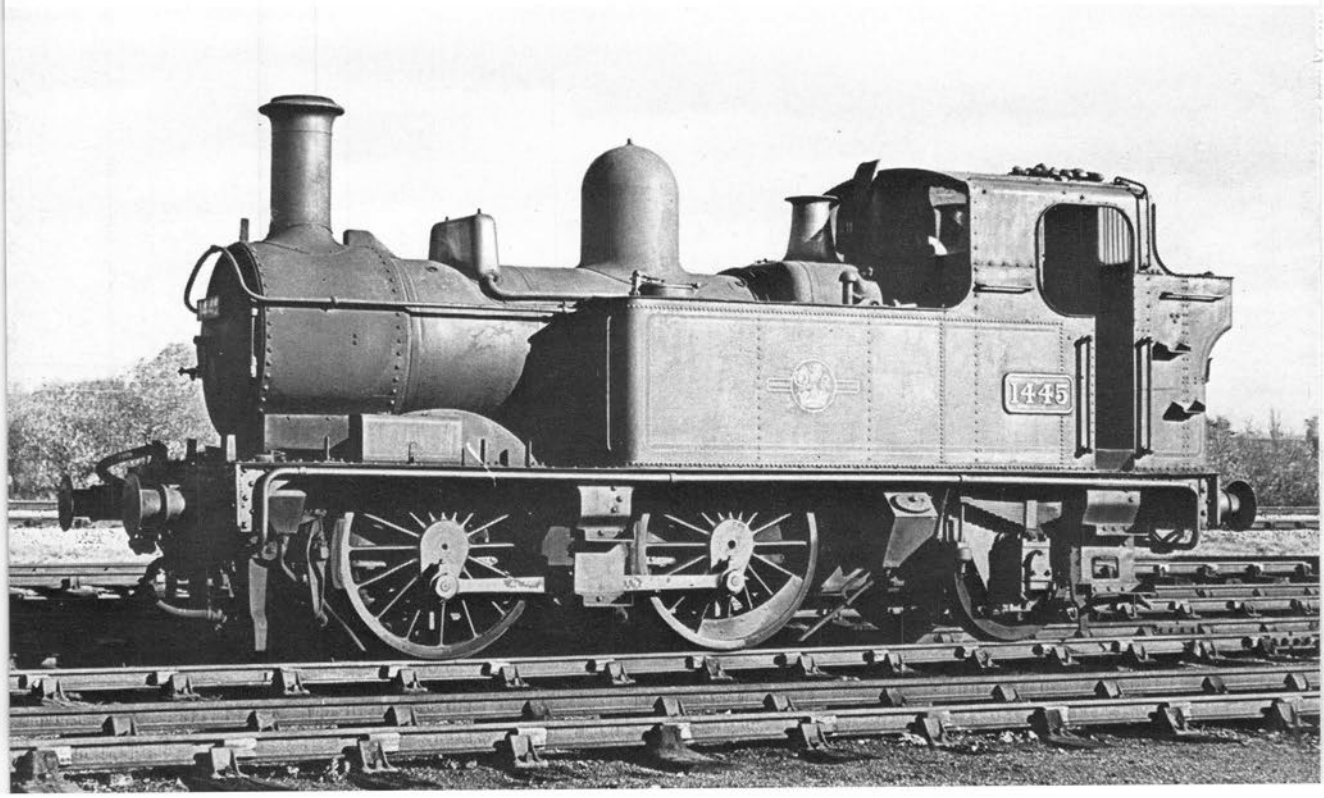
Top right: The 5800 class were identical to the 4800s, except that they were not fitted with auto-train gear, or ATC, as they were intended for use as branch line and shunting engines. No 5800 is seen here, in rather grubby post-war GWR livery, leaving Swindon on 4 July 1947./*H. C. Casserley*

Centre right: With the auto-train gear visible on the front buffer beam, 4800 class 0-4-2T No 1465 makes a pleasing picture as it heads a two-coach train on the Cheddar Valley line, to Wells (Tucker St.); seen leaving Yatton. The 4800 series were renumbered 1400-1474 in 1946, to make way for oil-burning 2-8-0s which were renumbered in the 4800 series temporarily. Henceforth the 0-4-2Ts became the 1400 class. /*Ian Allan Library*

Below: In early BR livery of plain black, 1400 class 0-4-2T No 1439 was photographed hauling auto-trailer No W9, on a Churston-Brixham turn, on 16 November 1954. The engine has top feed added to the boiler, which most of the class received, from 1944 onwards. Another addition made to the class was the provision of large whistle shields, intended to prevent steam from the whistle obscuring the cab windows./*D. S. Fish*

Above: An unidentified 1400 class 0-4-2T, sandwiched between auto-trailer No W50 and a corridor coach, on a Westbury-Salisbury auto-train, photographed near Warminster, on 17 April 1951. The auto-fitted engines were allocated over a wide area of the GWR system, whereas the non-auto engines (5800 class) were concentrated more in the Bristol and Worcester Divisions, than elsewhere./*J. F. Russell-Smith*

Below: Raking sunlight emphasises the character of Collett's attractive little 0-4-2T design, as No 1445 rests in the yard at Didcot, on 29 October 1962. The engine is in BR lined green livery and is in final condition, with top feed on the boiler, large whistle shield, and footsteps added to the bunker side. From late 1956 the class received plain green livery, and after 1957 a number ran in the fully lined-out style shown here./*R. A. Panting*



Above: In a setting of the kind railway modellers dream about, 0-4-2T No 1451 was photographed at Culmstock Halt with the 3.00pm Hemyock train on 15 June 1962. The closure of branch lines on a large scale, by British Railways, plus the introduction of diesel railcars led to the premature withdrawal of many of the class — with the 5800 series being the earlier candidates, because they lacked the auto-train gear. No 1451 was one of the engines that received fully lined BR green livery (see also page 17.)/*R. C. Riley*

Below: By September 1964, when this picture was taken, it was rare to find a 1400 class 0-4-2T still in steam, but until the following month (5 October) one of them made a thrice-weekly trip up the branch to Kington and Presteigne. No 1420 was photographed with a lightweight load, leaving Presteigne on 8 September 1964. The engine was withdrawn two months later, and subsequently purchased for preservation by the Dart Valley Railway. Two of the class, Nos 1442 and 1450, survived on the WR stockbook until May 1965; both were subsequently preserved./*E. J. S. Gadsden*

SECTION 10

7200 Class 2-8-2T Heavy Freight Tank Engines

Introduced: 1934
Total: 54
GWR Classification: E, Red
BR Power Class: 8F

Collett continued the construction of the powerful Churchward 4200 class 2-8-0T, specifically designed for short haul mineral traffic in South Wales. His own version, the 5205 class, appeared in 1923* and had such detail refinements as outside steam pipes, and in later batches, raised platforms over the cylinders. Batches of the 5205 series appeared from Swindon in 1923/4/5/6, 1930 and 1940. The engines built in 1930 were Nos 5275-5294, but fate took a hand and they were destined never to run in traffic as 2-8-0Ts, being stored from new, as surplus to requirements.

The reason was the decline in coal traffic in South Wales, brought about by economic depression and the change from coal to oil-burning for many sea-going vessels, with an increasing number of diesel-driven ships being introduced, and this added up to a dwindling Welsh coal traffic to the docks. The 2-8-0T had become a problem, because of their very restricted bunker capacity — only 4tons — which meant that surplus engines could not be used to replace the old 'Aberdare' 2-6-0s, on longer runs. The 'Aberdares' were due for renewal, and Collett solved the problem by converting a number of the 2-8-0Ts to 2-8-2Ts, by extending the frames at the back, and giving them an enlarged coal bunker capacity, with a radial truck added to the trailing end.

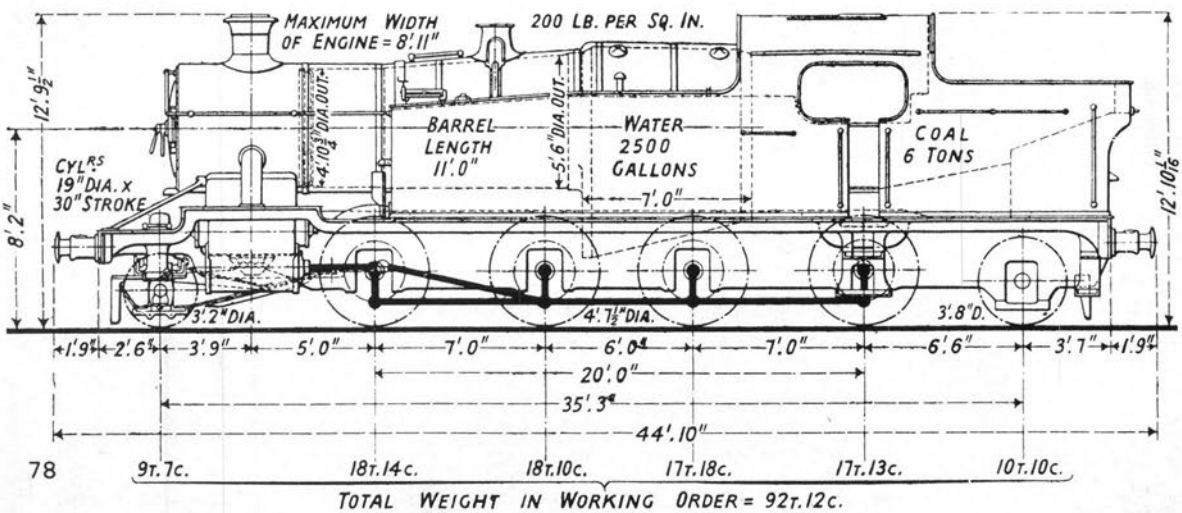
The 20 new engines stored, Nos 5275-5294, were the first candidates for rebuilding, becoming 7200 class 2-8-2Ts, Nos 7200-7219 respectively, and these entered traffic in 1934. So useful and powerful did they prove to be that the Operating Department requested more and two further batches were built, using engines of earlier builds, taken out of traffic. The second 20, Nos 7220-7239, were rebuilt from Nos 5255-5274, in that order, but the third batch, Nos 7240-7253 (known as the 7240 class), were rebuilt from much older Churchward engines and were more extensively reconstructed.

The principal dimensions of the series, Nos 7200-7239, were as follows: two cylinders, 19in diameter by 30in stroke, driving on to coupled wheels of 4ft 7½in. Tube heating surface 1349.64sq ft, firebox heating surface 128.72sq ft and superheater heating surface 191.79sq ft, giving a combined total of 1670.15sq ft. The grate area was 20.56sq ft, and the boiler pressure was 200lb. Tractive effort at 85% was 33170lb. Coal capacity was 6tons and water capacity was 2500gal.

The third batch, Nos 7240-7253, received

**The 5205 series are described in Section 10 of* Churchward Locomotives*; see Bibliography on page 128.*

Below: 7200 class 2-8-2T design, rebuilt from redundant examples of Churchward's 2-8-0T of 1910. The drawing depicts one of the engines rebuilt from Nos 5275-5294. The engines had the standard No 4 boiler.



new cylinders to bring them into line with the later engines, and the fuel capacity differed, with 5tons of coal and 2700gal of water; weight was 92tons 15cwt, instead of 92tons 12cwt.

The engines were rebuilt as follows:

Nos	7200-7219 (ex 5275-5294)	Swindon	1934
Nos	7220-7239 (ex 5255-5274)	Swindon	1935-36
No	7240 (ex 4239)	Swindon	1937
No	7241 (ex 4220)	Swindon	1937
No	7242 (ex 4202)	Swindon	1937
No	7243 (ex 4204)	Swindon	1938
No	7244 (ex 4216)	Swindon	1938
No	7245 (ex 4205)	Swindon	1938
No	7246 (ex 4234)	Swindon	1938
No	7247 (ex 4244)	Swindon	1938
No	7248 (ex 4249)	Swindon	1938
No	7249 (ex 4209)	Swindon	1938
No	7250 (ex 4219)	Swindon	1939
No	7251 (ex 4240)	Swindon	1939
No	7252 (ex 4210)	Swindon	1939
No	7253 (ex 4245)	Swindon	1939

These massive tank engines were mainly used from the South Wales area, with medium-haul mineral trains, although they did work through to London and Exeter in pre-war days. Some sidings had to be banned to the class as they proved to be prone to derailment on sharp curves, but otherwise they were highly regarded, and very impressive to watch in action. An odd twist of fate occurred in 1940, when wartime traffic brought about a renewed demand for the 2-8-0T type, and Swindon constructed a new batch of engines Nos 5255-5264 to replace the engines rebuilt as 2-8-2Ts.

First of class withdrawn: 7241 (1962).
Last of class withdrawn: 7205/48/9/52 (1965).
Examples preserved: 7200*, 7202.

**Still in Barry Scrapyard at the time of writing.*

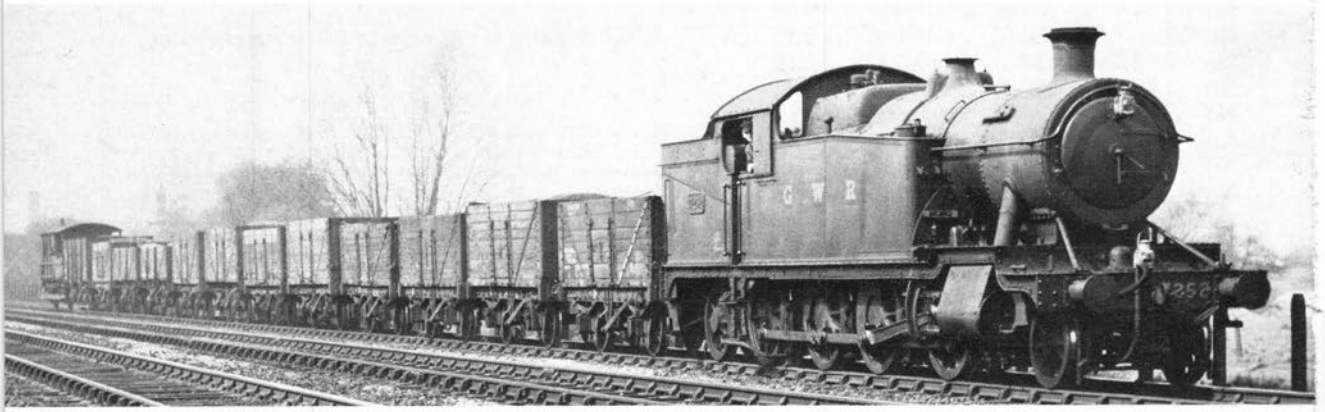
Below: 7200 class 2-8-2T No 7229, in pre-war livery, with tall safety valve bonnet and top lamp bracket on top of the smokebox. The second batch of rebuilds, Nos 7220-7239 (7220 class), appeared in 1935-36 and retained the old straight platforms above the cylinders of the original 2-8-0Ts Nos 5255-5274 from which they were rebuilt. Subsequently one or two received raised platforms, when new cylinders were found to be necessary. The upper lamp bracket was lowered to a position on the smokebox door in the mid 1940s./*P. Ransome-Wallis*

Below: 2-8-2T No 7252, photographed near Hayes. These engines were rare visitors to the London suburban area, after World War II, as they were displaced from South Wales-London coal traffic by 2-8-0 tender engines. No 7252 was one of the third batch (7240 class) rebuilt from the original Churchward 4200 series of 2-8-0Ts, and had a new front end with raised footplating over the cylinders. Coal capacity of the 7240 series was 5tons instead of 6tons, and water capacity was 2700gal, an increase of 200gal over Nos 7200-7239./*E. R. Wethersett*

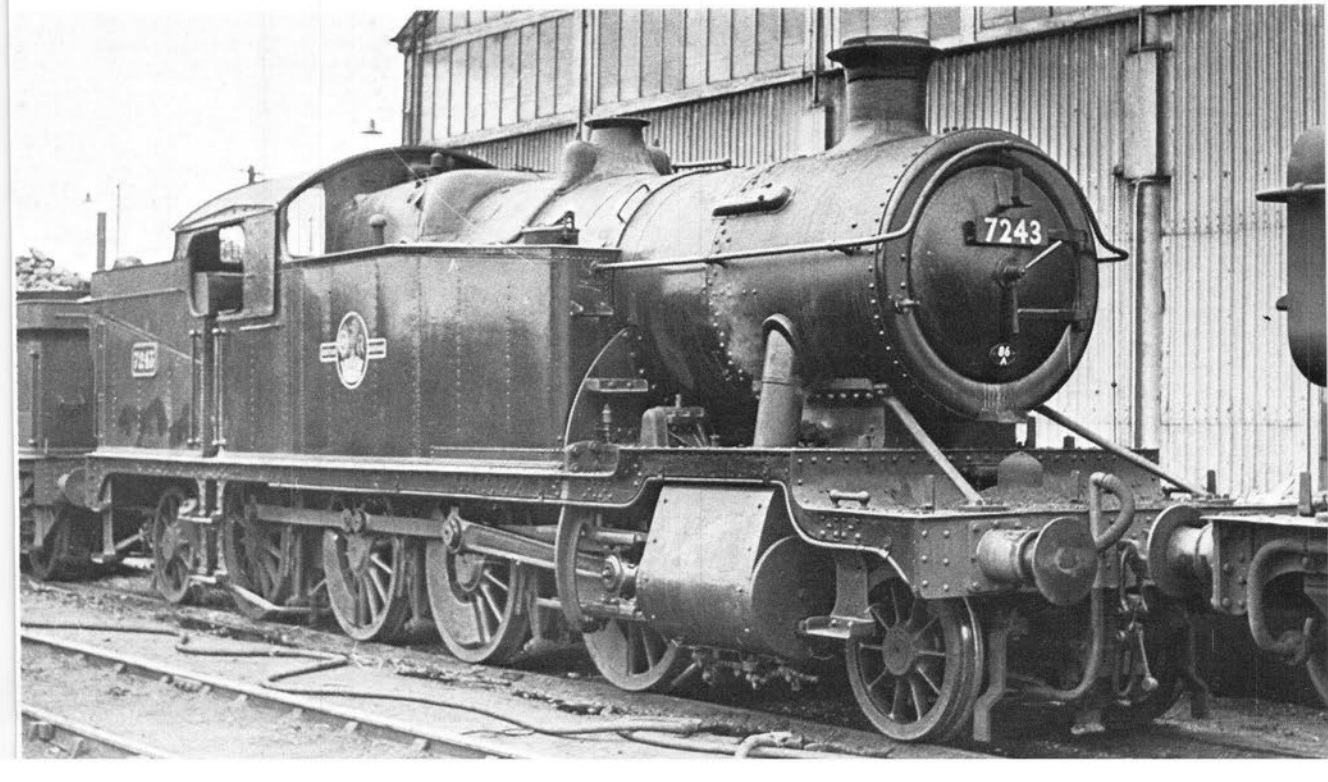
Bottom: Three engines of the 7200 class 2-8-2Ts were sent to Newton Abbot, after the war, for use on the West Country banks, but the class remained associated with South Wales in the main. No 7241 was photographed on an up empty stock train from Torre Yard to Newton Abbot on 30 March 1955. In 1958, No 7253 was sent to the Lickey Incline for trials as a banking engine, but proved to be unsuitable due to restricted platform clearances over the outside cylinders, in Bromsgrove station./*C. H. S. Owen*

Above right: Main line intermediate freight workings were the ideal duties for the 7200 class, as depicted here, with No 7252 on a South Wales-Salisbury mineral train. The engine was photographed leaving Westbury, with 5600 class 0-6-0T No 6625 providing banking assistance, at the rear. No 7252 was originally 2-8-0T No 4210, dating back to 1912. /*G. A. Richardson*

Below right: Compared with the illustration of 2-8-2T No 7229 on page 79, this picture of No 7243, taken at Oxford on 1 October 1959, shows the later condition of these engines, with smaller safety valve bonnet and top lamp bracket resited on smokebox door. Rainstrips added to cab roof. Oxford was one of the few sheds outside the South Wales area that had a small allocation of these powerful and impressive tank engines. /*E. M. Patterson*



7252


7243

SECTION 11

1366 Class 0-6-PT Dock Shunting Tank Engines

Introduced: 1934
Total: 6
GWR Classification: Ungrouped/Uncoloured
BR Power Class: 1F

When six more small dock tanks were required, in 1934, to replace life-expired engines of the 1392 class (which had originated on the Cornwall Minerals Railway), Collett decided to improve upon the design of the small 1361 class which Churchward had introduced, for similar reasons, in 1910. The Churchward design was in itself an up-dated version of the old 1392s, with Allan valve gear, and they were the last saddle tanks built at Swindon.

The Collett version was basically the same, except that it had pannier tanks and a more modern appearance, with rounded cab and extended bunker, and the boiler had a Belpaire firebox in place of the original round top design. The overall boiler dimensions were very similar, and the outside cylinders had the same diameter of 16in, and the same 20in stroke. The tube heating surface was 715sq ft and the firebox heating surface was 73sq ft, giving a total of 788sq ft. Grate area was 10.7sq ft, and the boiler pressure was 165lb. Tractive effort at 85% was 16 320lb.

The engines were built as follows:

Nos 1366-1371	*Swindon*	*1934*

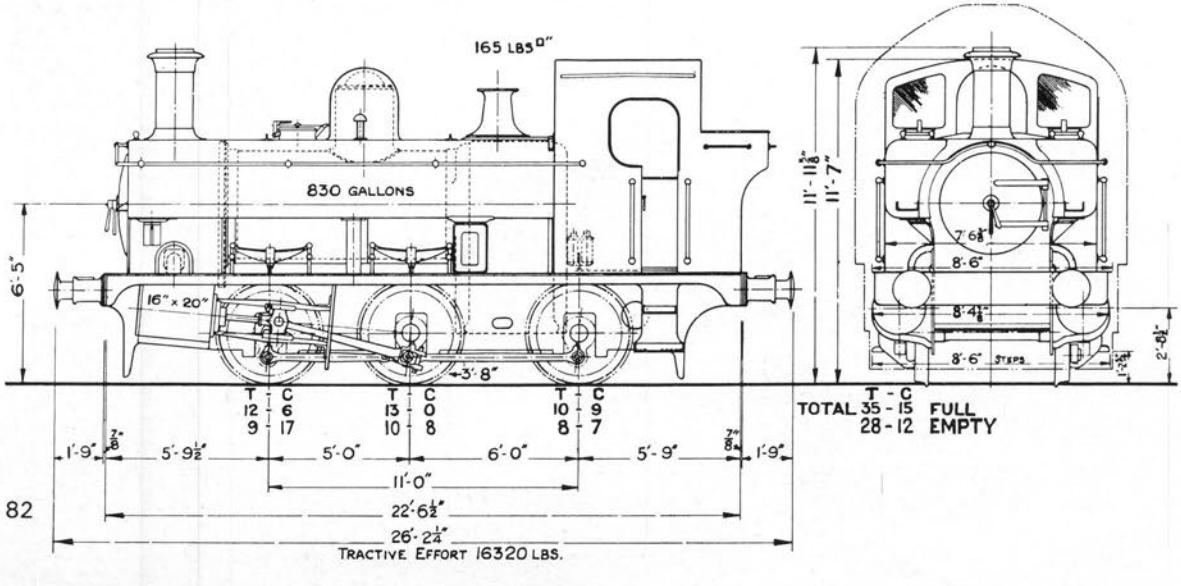
Although the original design had been for use on Cornish wharves and sidings, where the curves were too sharp to allow any larger engines, the six new engines were actually ordered for use in Swindon Wagon Shops, and they were ideal for this purpose as they could go virtually anywhere that a standard goods wagon could go. Later they were used elsewhere, including Weymouth Docks, and finally on the former SR Wenford Bridge mineral branch.

First of class withdrawn: 1370 (1960).
Last of class withdrawn: 1367/8 (1964).
Example preserved: 1369.

Below: 1366 class 0-6-0PT for Dock shunting duties.

Above right: A delightful scene on Weymouth Quay, as a 1366 class 0-6-0PT works bunker-first toward Weymouth Quay station, on a freight train. No steam-heating hose fitted during the summer months. Bell and tool-box on the running plate below the pannier tank; brackets for fire irons on rear of bunker, and note how the fireman has wedged his shovel behind the handrail on the bunker side. Nos 1367-1370 all received steam-heating for use at Weymouth; they also had a footplate step and handrail added to the front, at the right hand side, for use by the shunter. Note the diminutive size of the engine, when compared to the standard 12ton van behind it./*J. C. Flemons*

Below right: 1366 class 0-6-0PT No 1368, standing at Wadebridge. Nos 1367/8/9 were sent to Wadebridge late in their careers, to replace the ex-LSWR Beattie 2-4-0 Well Tanks on the SR Wenford Bridge china clay trains. No 1368 still carried steam heating provision, and the footstep added ahead of the right hand cylinder can be seen in this photograph. /*M. York*



MARINE AND MOTOR ENGINEERS
REPAIRERS AND CHANDLERS
HOSTEL
CPR 94

1368

SECTION 12

6800 Class 4-6-0 2-cyl Mixed-Traffic Engines

Introduced: 1936
Total: 80
GWR Classification: D, Red
BR Power Class: 5MT
'Grange'

G. J. Churchward's standard locomotive scheme of 1901 had envisaged a 5ft 8in 4-6-0 with the standard No 1 boiler and two outside cylinders, but it was not until 1936 that this pure-Churchward design actually materialised, in the form of the 'Grange' class 4-6-0. Collett's contribution was largely confined to the provision of his larger side-window cab, screw reverse and other detail refinements.

The 'Grange' class was introduced to replace life-expired Churchward 4300 class Moguls, and as such was the long awaited answer to requests from the Running Department for bogie engines for such duties. Collett decided that a range of 4-6-0s, from the 'Hall' to the 'Grange' and 'Manor' (see page 88), would answer the need for versatile mixed-traffic engines, and would allow the withdrawal of all the various 2-6-0 and 4-4-0 types still in service. By withdrawing 80 Churchward Moguls he was able to use the wheels and motion and some other items for the new 'Grange' class; together with the same standard No 1 boiler he used on the 'Hall's, to which they were generally similar except for the smaller coupled wheels. The scheme was curtailed by the outbreak of World War II, and never proceeded beyond the original 80 engines.

The principal dimensions were as follows: the cylinders were of 18½in diameter by 30in stroke, driving on to coupled wheels of 5ft 8in. The standard No 1 boiler had a tube heating surface of 1680.60sq ft, a firebox heating surface of 154.78sq ft and a superheater heating surface of 262.62sq ft, giving a total combined heating surface of 2104.00sq ft. The grate area was 27.07sq ft, and the boiler pressure was 225lb. Tractive effort was 28 875lb at 85%, compared with 27 275lb for the 'Hall', due to the smaller coupled wheel diameter.

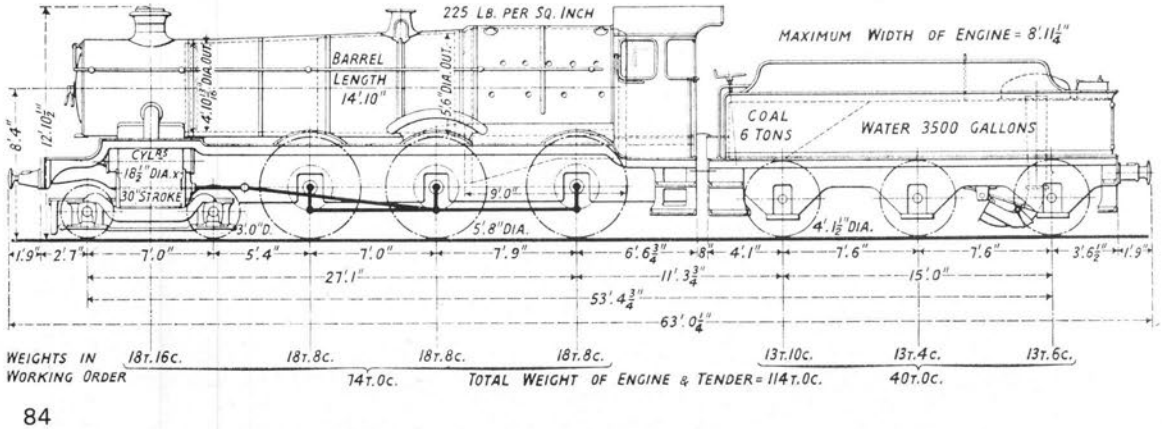
Because the 'Grange' class appeared as late as 1936 they were built new with all the detail refinements of the Collett era, such as smokebox door lamp irons, whistle shields and audible signalling apparatus. As they had 18tons 8cwt loading on the coupled wheels they were placed in the 'red' route grouping and could not therefore go over as many routes as the 'blue' 2-6-0s they were intended to replace, but Collett later produced his lightweight 'Manor' to answer this need, as described on page 88.

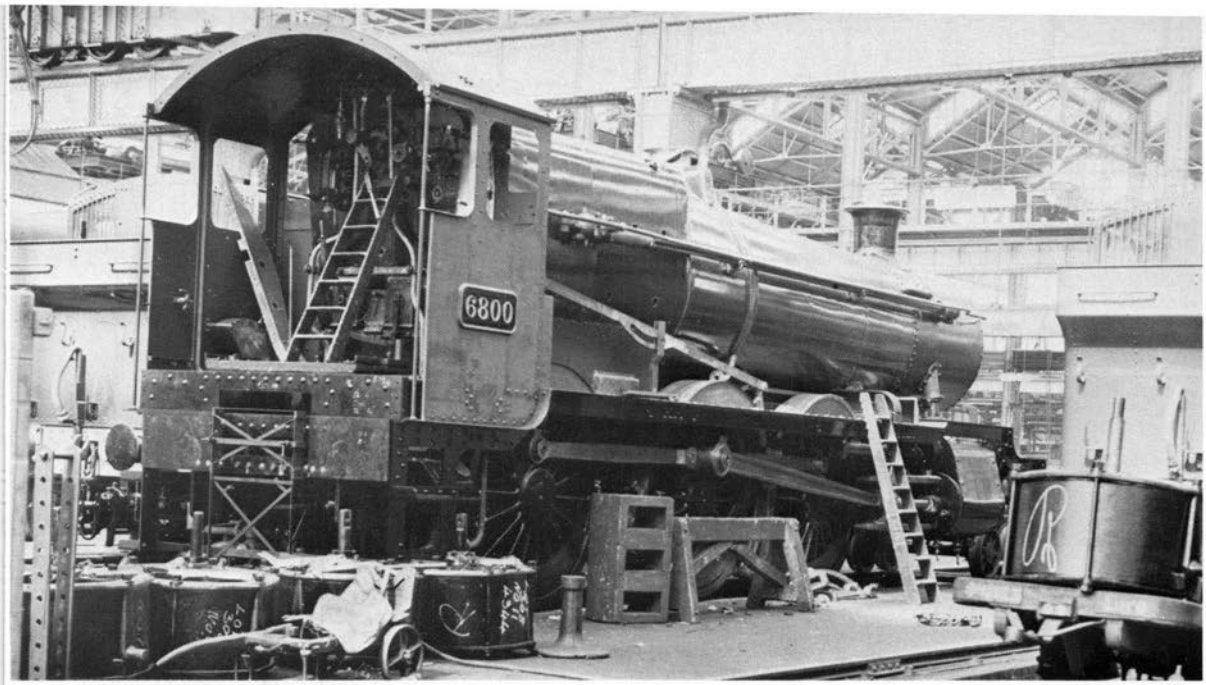
The engines were built as follows:

Nos 6800-6879 Swindon 1936-39

The substitution of the standard No 1 boiler for the No 4 of the Moguls, meant that the new 4-6-0s were more powerful, and they proved to be most useful engines with an

Below: 6800 class 'Grange' 4-6-0, with 3500gal tender attached.





allocation spread over the majority of the system, being used on a variety of mixed-traffic duties as well as being pressed into passenger excursion work at peak periods, when they could display a lively turn of speed.

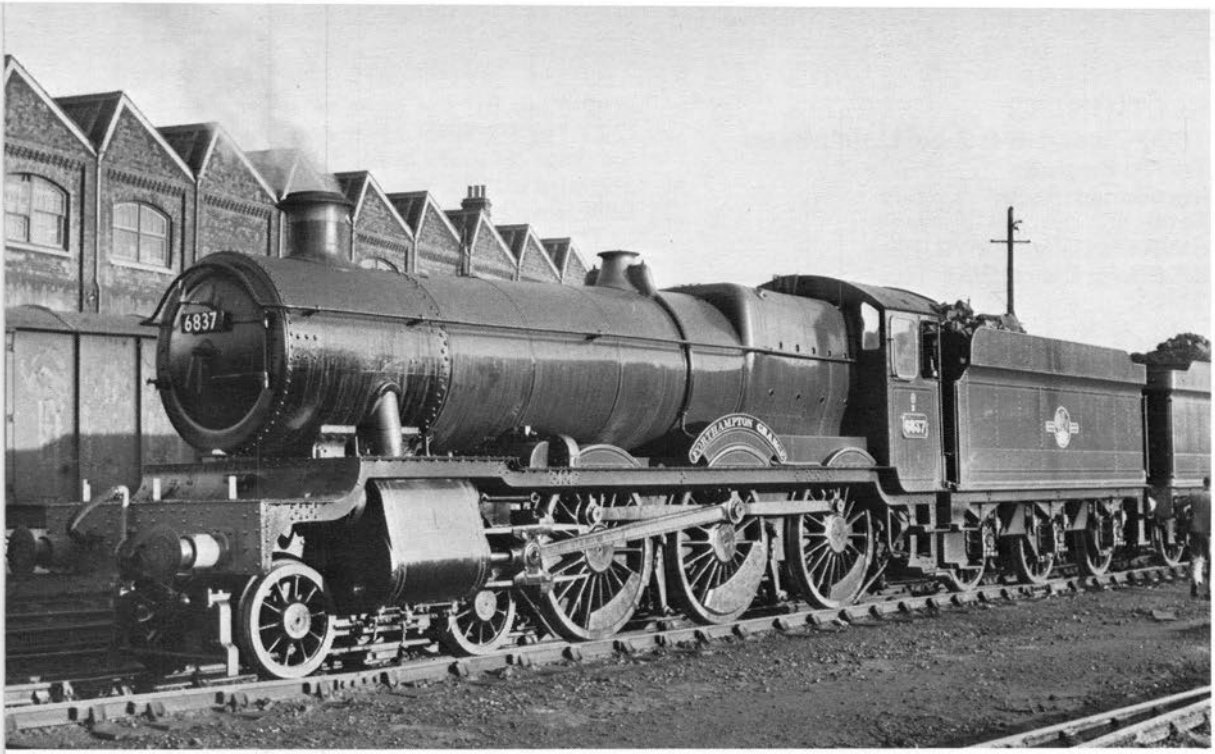
First of class withdrawn: 6801 (1960).
Last of class withdrawn: 6847/8/9, 6872 (1965).
None preserved.

Above: First engine of the 'Grange' class, No 6800 *Arlington Grange,* photographed whilst under construction at Swindon Works on 16 August 1936. Livery was unlined Brunswick green with black cylinders and footplating. The initial batch of four engines had a plain cast iron chimney as seen here; later engines had a copper cap, as seen in the illustrations that follow. The wheels and motion were from withdrawn Churchward 4300 series Moguls, which the new 'Granges' were intended to replace, but the outbreak of World War II caused the cancellation of the programme after only 80 Moguls had been replaced by the 'Grange' class (a further 20 were replaced by the smaller 'Manor' class, as described on page 88.) The scheme was never revived after the war./*H. C. Casserley*

Below: In a fresh coat of wartime black, with the cab side windows blanked-off, and air raid precaution sheeting visible on top of the cab roof, 'Grange' 4-6-0 No 6821 *Leaton Grange* was photographed at the head of some decidedly grubby passenger stock, at Reading West Junction. The stopping train was used as a running-in turn for engines fresh from Swindon Works. No evidence of polish on the copper chimney cap, and the brass safety valve casing had been painted black. 3500gal Churchward tenders were at first attached to the class, as with the 2-6-0s they replaced./*M. W. Earley*

Above: 'Grange' class 4-6-0 No 6844 *Penhydd Grange* in post-war GWR livery, at the head of a train of milk empties, including some demountable road tanks. The smaller wheels of the 'Grange' class, compared to the 'Hall' meant that the framing had a raised part over the outside cylinders (also a feature of the smaller 'Manors') and the standard No 1 boiler was pitched lower, at 8ft 4in. Although nominally a replacement for the Moguls, which had a 'blue' route availability, the 'Grange' class were heavier and had a 'red' route code, which meant they could only be used over the same routes as the 'Halls'./*M. W. Earley*

Below: A feature of the fireman's side of the 'Grange' class 4-6-0s was the provision of a fire iron casing alongside the firebox, as can be seen here on No 6869 *Resolven Grange,* photographed on shed at Laira on 27 June 1955, with pannier tank No 9770 perched above in the background. The engine was in plain black BR livery, (although many received the lined black mixed-traffic scheme in early BR days) and carried a 'Hall' class boiler with chimney to match. Exchange of the standard No 1 boiler between classes resulted in like exchange of chimneys./*R. E. Vincent*



Above: Full BR green livery, with lining out was introduced for the 'Grange' class in 1956, as seen here on No 6837 *Forthampton Grange* photographed at Swindon in ex-works condition, in 1960. The engine carried a boiler with improved draughting, with a new narrower chimney, similar to the 'Hall' class engines so treated (see pages 96-97) and a 4000gal Collett tender was attached, in place of the original 3500gal Churchward one fitted./*H. Wheeler*

Below: Also attached to a 4000gal Collett tender, No 6824 *Ashley Grange* heads a Plymouth-Penzance parcels train alongside the Tamar Estuary on 29 April 1962. Withdrawals commenced in 1960, but four of the class survived until the end of WR steam workings. Surprisingly none were preserved./*Author*

SECTION 13

7800 Class 4-6-0 2-cyl Light Mixed-Traffic Engines

Introduced: 1938
Total: 30
GWR Classification: D, Blue
BR Power Class: 5MT
'Manor'

Collett's final 4-6-0 design for the Great Western, the 'Manor' class, was ironically to prove his least successful, as originally built. His policy, as stated on page 84, was to replace existing 2-6-0 and 4-4-0 designs with a range of 4-6-0s of mixed-traffic capabilities. The 'Manor' was the final, lightweight, design needed to implement this scheme. The axle loading was just over 17tons and it was low enough to make them suitable for use over 'blue' routes, where the larger 'Grange' class were barred. The first 20 engines constructed utilised the wheels and motion of withdrawn Churchward 4300 class Moguls, and but for the intervention of World War II this policy of cannibalisation would have continued.

The leading dimensions were as follows: two cylinders 18in diameter by 30in stroke driving on to coupled wheels of 5ft 8in diameter. A new standard No 14 boiler was designed for the class, in order to keep the weight down, and it was shorter, smaller in overall diameter and had a smaller grate than the 'Grange' class boiler. Comparative dimensions were as follows ('Grange' class dimensions in brackets): tube heating surface 1285.5sq ft (1686.60sq ft), firebox heating surface 140sq ft (154.78sq ft) and superheater heating surface 190sq ft (262.62sq ft); the grate area was 22.1sq ft (27.07sq ft). Total combined heating surface for the 'Manor' was 1615.5sq ft. Boiler pressure was 225lb, and the tractive effort, at 85%, was 27 340lb.

The new boiler proved to be an indifferent steam producer and it was not until a series of tests with No 7818 were made, in 1951-52, that the draughting arrangements were modified, and the performance of the boiler was transformed.

The engines were built as follows:

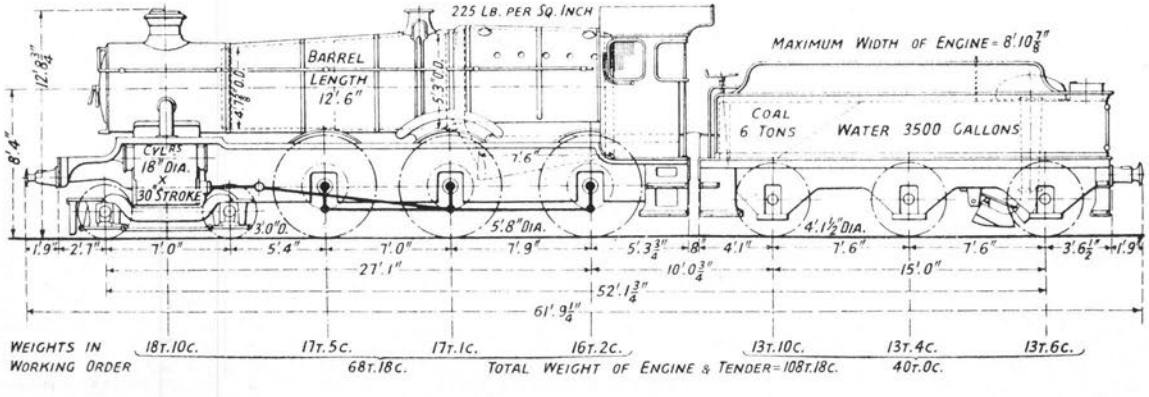
Nos 7800-7809	Swindon	1938
Nos 7810-7819	Swindon	1938-39
Nos 7820-7829	Swindon	1950

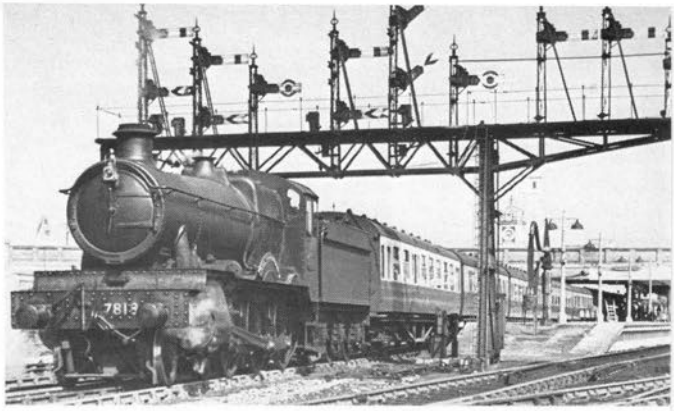
The batch of 10 engines built in 1950, after the retirement of Mr. Hawksworth, were entirely new engines and did not have any cannibalised parts from the Moguls incorporated in them.

First of class withdrawn: 7809 (1963).
Last of class withdrawn: 7829 (1965).
Examples preserved: 7808, 7812, 7819, 7820*, 7822, 7827.

**Still in Barry Scrapyard at the time of writing.*

Below: 7800 class 'Manor' 4-6-0; with Churchward 3500gal tender attached.

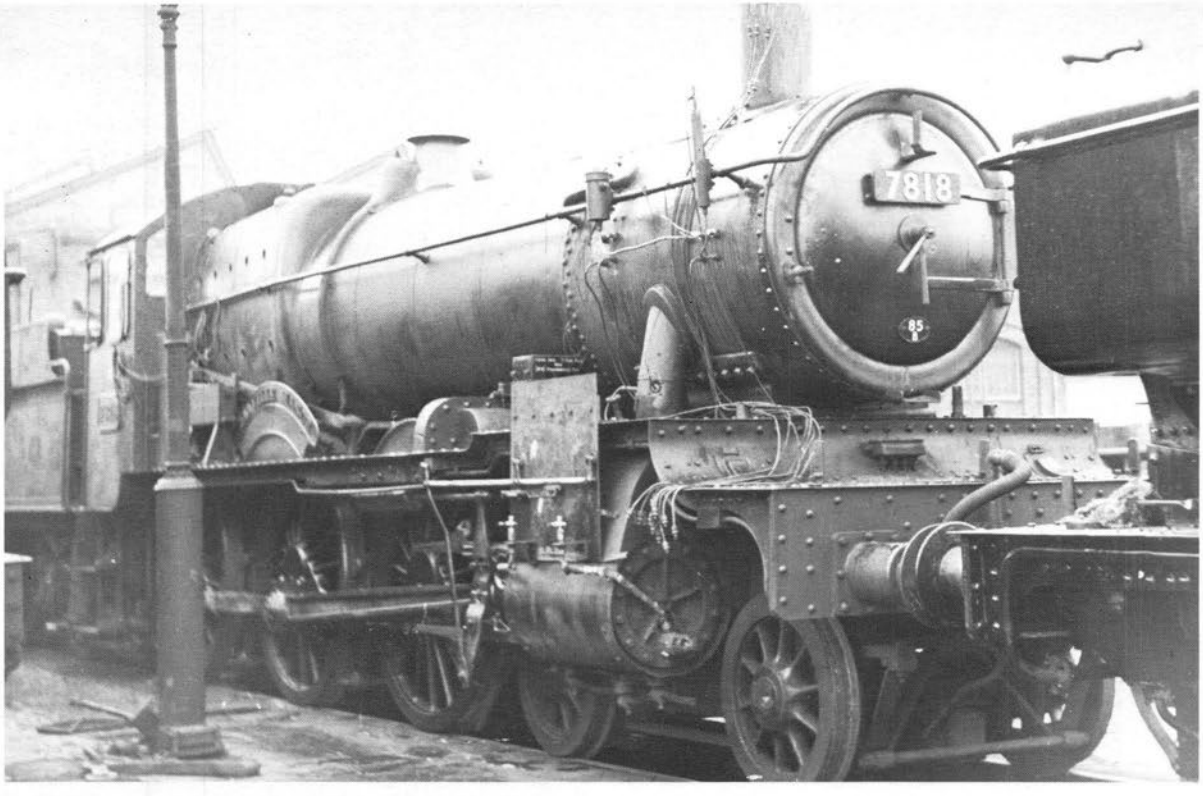




Top right: 'Manor' class 4-6-0 No 7818 *Granville Manor* photographed at Southampton Central on 9 August 1947 at the head of a cross-country train to Cheltenham, with GWR stock. The Churchward 3500gal tender originally fitted had been replaced by an 'Intermediate' 3500gal tender, with long side fenders. The 'Manors' were easily recognised by the rise in the platform contour over the cylinders, and the much shallower footplate angle used. Nos 7800-7819 incorporated the wheels and motion from withdrawn Churchward Moguls. */Pursey C. Short*

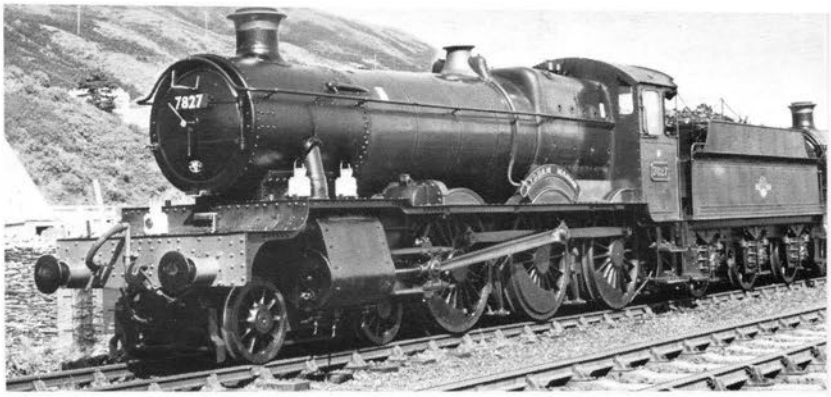
Centre right: Attached to a Churchward 3500gal tender, 'Manor' class 4-6-0 No 7804 *Baydon Manor* was photographed on shed in August 1950. In common with other Collett classes the lightweight 4-6-0s had large side-window cabs and screw reverse, but, as can be seen from this rear ¾ view, they did not have the four-cone ejectors which were fitted as standard to the larger 4-6-0s. During World War II the cabside windows were blanked-off on Nos 7800-7819./*P. Ransome-Wallis*

Below: The original allocation of the 'Manors' was for work over the Banbury-Cheltenham-Swansea section used by through trains from the north-east, and over the Devizes line. Wartime saw some at Oswestry and they were the first 4-6-0s allowed on the former Cambrian line. Much later some were transferred for banking and pilot duties in the West Country, and allocated to Newton Abbot and Plymouth. No 7813 *Freshford Manor* is seen here piloting 'Hall' class 4-6-0 No 5916 *Walton Hall* on the Saturdays only 6.55am Paddington-Penzance express, at the foot of Dainton Bank, on 4 August 1956. The engine is attached to an 'Intermediate' 3500gal tender and is painted in plain black BR livery./*T. E. Williams*



Above: Since their introduction, the 'Manors' had been noted for their indifferent steaming, but it was not until a series of tests were made with No 7818 *Granville Manor* in 1951-52 at Swindon, that this serious problem was fully analysed, and traced to incorrect draughting. A tall stove pipe chimney, with an orifice diameter of 4⅝in, replaced the standard blastpipe and jumper top fitted to the engine, and the chimney was redesigned. Performance and steam raising were transformed. The entire class were then redraughted accordingly and fitted with a new design of narrow chimney, with a flared copper cap, straight sides and a flared base. No 7818 is seen here at Swindon, during the trials; photographed on 23 March 1952./*T. E. Williams*

Below: The new-style chimney fitted after the improved draughting is well illustrated in this photograph of No 7822 *Foxcote Manor,* seen leaving Barmouth with a Birkenhead train, on 31 May 1956. Although painted in plain black livery, the engine positively shines, and the Churchward tender sports the large transfer of the BR lion and wheel totem. Standing in the bay is No 5801, a Collett 5800 class 0-4-2T, with BR smokebox numberplate but still in full GWR livery./*P. H. Wells*



Top right: The plain black livery gave way to fully lined BR green at the end of 1956, as seen here on 'Manor' class 4-6-0 No 7827 *Lydham Manor,* photographed at Aberdovey on 10 August 1963. The immaculate condition was typical of the way these engines were kept and a few were still working the 'Cambrian Coast Express' in the final months of steam. No 7827 has a Churchward 3500gal tender attached. The engine itself was only six years old when this photograph was taken, being one of the batch of ten built at Swindon as late as 1950./*K. R. Pirt*

Centre right: No less than 16 years after the GWR became part of the nationalised system, the Churchward tender attached to 'Manor' class 4-6-0 No 7816 *Frilsham Manor* was still proudly carrying the former company's initials! The engine was photographed on shed at Swindon, on 20 September 1964. The engine has BR 25KV overhead live wire warning notices on the sides of the boiler and firebox. /*Brian Stephenson*

Below: On Southern Region territory, 'Manor' class 4-6-0 No 7808 *Cookham Manor* was photographed leaving Betchworth station with a cross-country Redhill-Guildford-Reading train on 8 April 1964. Once Swindon had cured the steaming troubles, these engines became extremely popular with footplatemen on such duties, and no less than six out of the total of 30 built have since been rescued for preservation, no doubt because they are ideal for use on preserved lines, with their light axle loading./*D. B. Clark*

Great Western Steam Finale

F. W. Hawksworth
Chief Mechanical Engineer, 1941-1949.

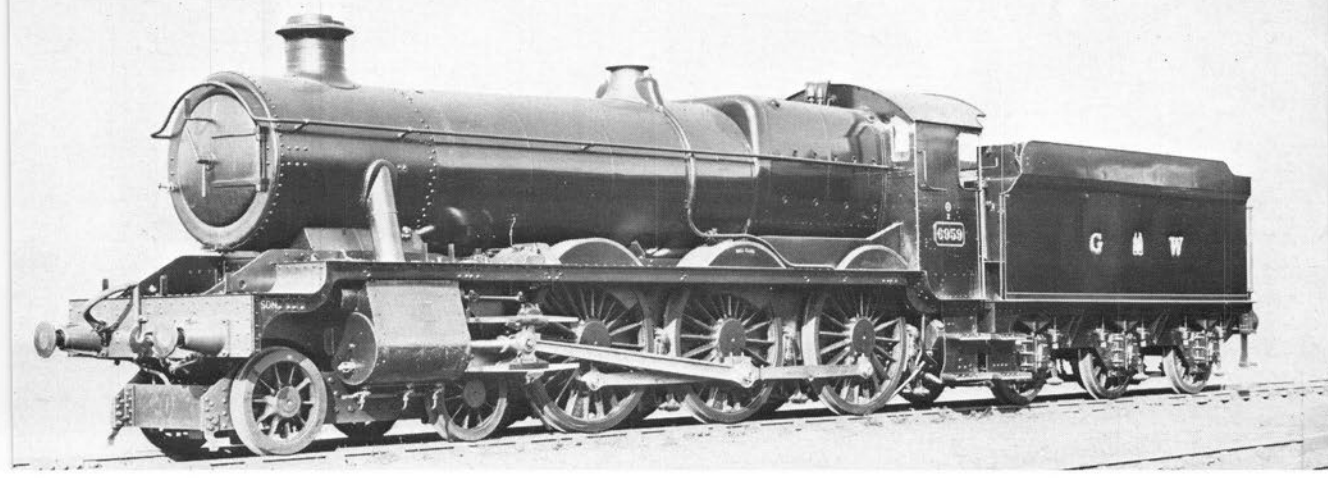
F. W. Hawksworth was appointed Chief Mechanical Engineer of the GWR in July 1941, following the retirement of C. B. Collett. Britain was in the midst of war and the emergency conditions prevailing precluded any normal locomotive development work for the first few years of Hawksworth's régime. Swindon was building a number of LMS standard 8F 2-8-0s for War Department requirements, and the pre-war locomotive building programme had been virtually abandoned when Hawksworth took office; the works was also making many items of wartime hardware and armament.

As the war progressed there was a change of emphasis back to locomotive repair and construction, to alleviate a growing shortage of serviceable motive power. Much emphasis was placed upon the need for new freight and shunting engines, under a policy controlled by the Mechanical Engineer's Committee of the Railway Executive, from 1941 to 1945, but there was considerable pressure for mixed-traffic locomotives on the GWR and construction of the 'Hall' class 4-6-0 continued on a modest scale; with a modified design from 1944 onwards.

The most significant change of GWR locomotive design made by Hawksworth was the development of a higher degree of superheat, which he considered necessary to combat the effects upon locomotive performance of the poor fuel available. The coal varied in quality so much that even the keenest footplatemen were sometimes hard-pressed to keep steam with the moderate superheat Churchward boilers, and Hawksworth decided that any new construction must incorporate a higher degree of superheat. He also decided to simplify the construction of new engines by changing to main plate frames throughout, with a simple plate frame bogie. These new features were introduced with the 'Modified Hall', or 6959 class, of 1944.

Poor fuel continued to be a problem with the return to peacetime conditions and Hawksworth was still developing superheating when the GWR was nationalised in January 1948. He then became subservient to the new Railway Executive, with R. A. Riddles appointed as Member of the Railway Executive for Mechanical Engineering. Hawksworth retired on 31 December 1949, but locomotives of his design were constructed until 1956, whilst his work on improved superheating was further developed after his retirement and successfully applied to the 'King', 'Castle' and 'County' class 4-6-0s.

Below: Finished in the austere black livery of wartime, No 6959, first of the 'Modified Halls', is seen in as-built condition, without cabside windows or nameplates. The words 'Hall Class' were painted in small letters on the centre splasher. Engines of the earlier Collett series, Nos 6906-6958 built during the war had also appeared without cabside windows, and Nos 6960-6970 of the new series were similarly treated. All these engines had the windows fitted between 1945-48, when they also received nameplates. No 6959 then became *Peatling Hall.* The change to plate frames throughout required a new pattern of cylinders, with individual castings bolted to the outside of the main frames. A fabricated structure with smokebox saddle formed the stay between the cylinders. The new plate frame bogie had a longer wheelbase and wheels of 3ft 0in diameter, as for the 'King' class./*British Rail WR*



SECTION 14

6959 Class 4-6-0 2-cyl Mixed-Traffic Engines

Introduced: 1944
Total: 71
GWR Classification: D, Red*
BR Power Class: 5MT
Modified 'Hall'

The highly successful Collett 'Hall' class mixed-traffic design had been constructed at a steady pace ever since its introduction, and when Hawksworth was able to plan for post-war locomotive building he envisaged a continued requirement for the type. To improve upon the basic design would have been no easy task, but he did realise that some changes were necessary to allow for the more difficult operating conditions likely to prevail.

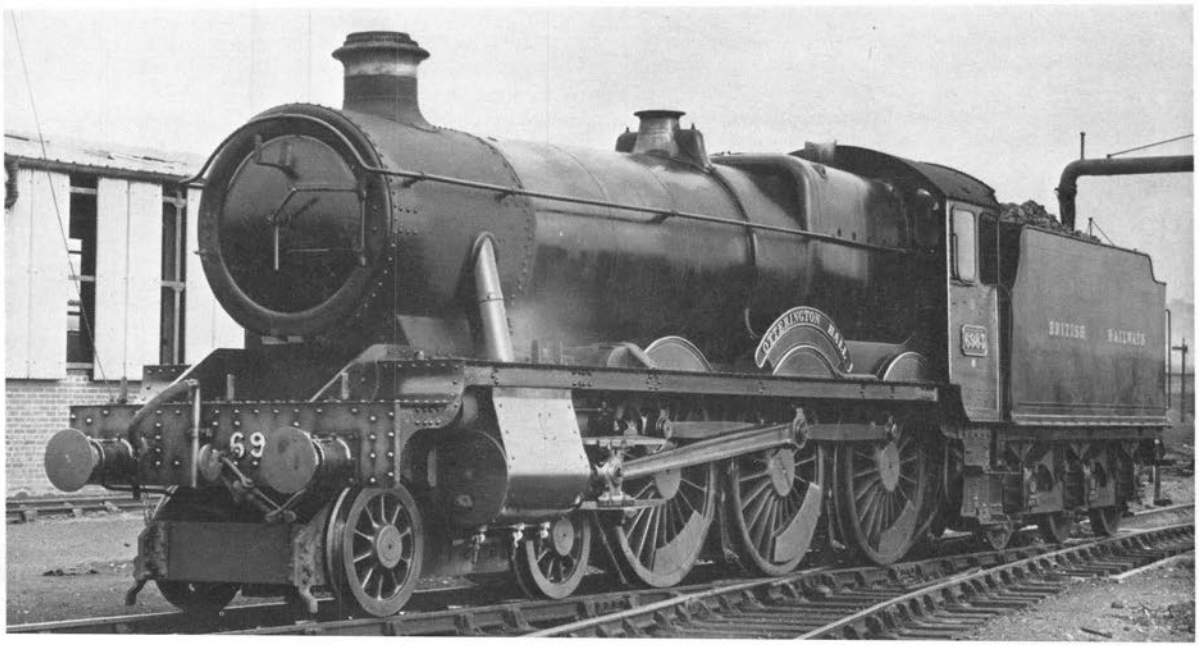
In particular he opted for a higher degree of superheating in the excellent standard No 1 boiler; by means of a new three-row superheater, with header regulator. The Churchward standard pattern of frame construction, with its use of bar frame extensions at the leading end, was abandoned in favour of the simple layout of plate frames throughout, with new pattern cylinders and fabricated saddle, and the Swindon/De Glehn bogie with its bar frame was superseded by one of plate framing, with individual springs and lengthened wheelbase.

The first 'Modified Hall' appeared in 1944, finished in plain wartime black livery, and being No 6959 gave its identity to the new series, which were officially referred to as the 6959 class to distinguish them from the original Collett engines. Since the construction of No 6915 in February 1941, new engines had left Swindon without names, and Nos 6959-6970 built in 1944 also ran nameless for some two to three years. In traffic the 'Modified Halls' were an immediate success and showed an ability to steam freely with the inferior fuel then available.

The principal dimensions of the 6959 class, as first built, were as follows: two cylinders 18½in diameter by 30in stroke driving on to coupled wheels of 6ft 0in diameter; the bogie wheels were of 3ft 0in diameter, with a wheelbase of 7ft 2in, compared to the 7ft 0in wheelbase on the original design; the boiler had a larger superheater and the total heating surface was 2052.1sq ft, made up of a tube heating surface of 1582.6sq ft, a firebox heating surface of 154.9sq ft and a superheater heating surface of 314.6sq ft. Later the elements were shortened, reducing

**Some engines carried a white 'X' suffix to denote that normal loading could be exceeded.*

Below: Commencing with the construction of No 6971, the 'Modified Hall' class came out with new pattern straight-sided tenders of similar appearance to the design introduced by Hawksworth for the 'County' class (see page 98.) They held 6tons of coal and 4000gal of water and weighed 47tons 6cwt full. No 6983 *Otterington Hall* is seen here with the Hawksworth tender, in GWR green, but lettered British Railways in Swindon-style lettering. The engine has a small W suffix painted below the cabside numberplate. This hybrid livery was applied because the engine was built in February 1948, immediately after nationalisation and before any decisions had been taken on new BR locomotive liveries./*Ian Allan Library*



the superheater heating surface to 295sq ft and the combined total heating surface to 2032.95sq ft. The grate area was 27.07sq ft, and the boiler pressure was 225lb. Tractive effort remained the same, at 27 275lb at 85%. These alterations resulted in a slight increase in weight for the engines; by 16cwt.

The engines were built as follows:

Nos 6959-6970	Swindon	1944
Nos 6971-6990	Swindon	1947-48
Nos 6991-6999 7900-7919	Swindon	1948-50
Nos 7920-7929	Swindon	1950

A total of 71 engines of the 'Modified Hall' class were thus added to the original Collett series, to produce a grand total of 330 highly versatile and useful mixed-traffic engines. Their undoubted success had considerable influence upon the adoption of the two-cylinder 4-6-0 mixed-traffic concept on the LMS and LNER prior to nationalisation, and by BR for the final years of steam. Starting with Churchward's 'Saint' class and ending with the Riddles 73000 series, the type (and not least the 'Modified Hall') must surely represent one of the all-time classics of British steam locomotive design.

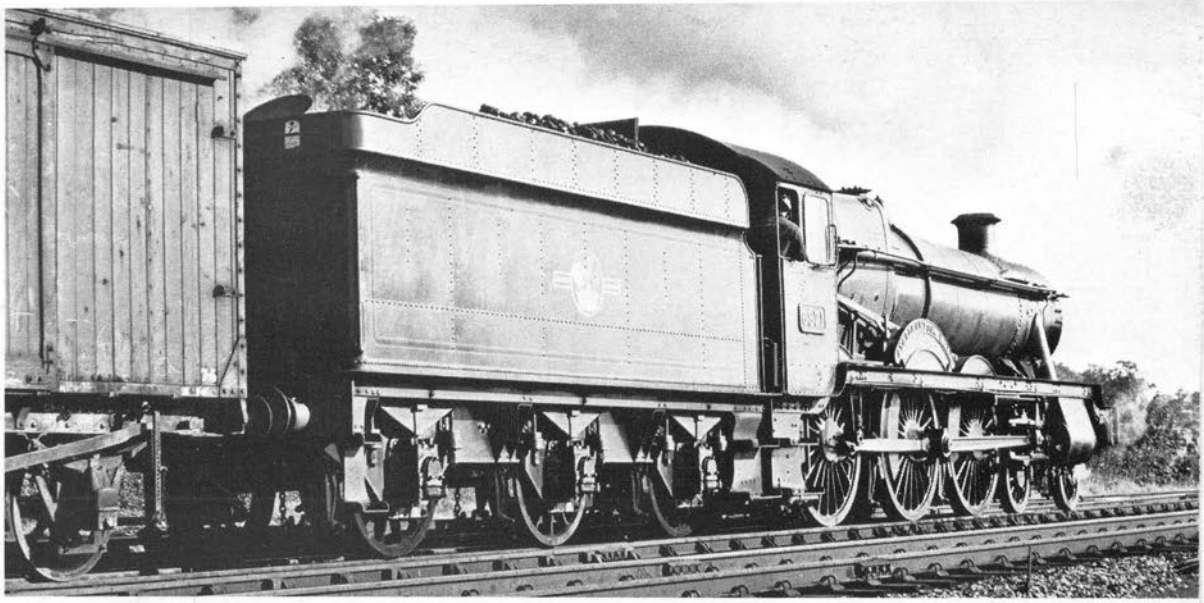
First of class withdrawn: 6962 (1963).
Last of class withdrawn: 6959/67/84/91/3/9, 7904/7/14/9/22/4/5/7 (1965).
Examples preserved: 6960, 6989, 6990, 6998.

Below: A 'Modified Hall' was one of the three former GWR locomotive types to be selected for the now famous Locomotive Exchange trials, of April-September 1948, which were held to establish the relative capabilities and efficiences of existing types before design work was commenced upon the new BR standard locomotives. The Western engines were somewhat restricted in their route availability, and the 'King' class could only run on Paddington-Plymouth and Kings Cross-Leeds trials; the 2800 class 2-8-0 ran on Ferme Park-Peterborough, Acton-Severn Jct and Eastleigh-Bristol freights, whilst the 'Modified Hall' ran on Marylebone-Manchester and Bristol-Plymouth trials. No 6990 *Witherslack Hall* was photographed on the 10.00am down Manchester express, passing Arkwright Street, Nottingham on 24 June 1948./*J. P. Wilson*

Above right: Tenders were frequently exchanged between locomotives, and sometimes produced odd results, as seen here on 'Modified Hall' class 4-6-0 No 7911 *Lady Margaret Hall;* built at Swindon in February 1950. The flush-sided Hawksworth tender with which the engine was originally built had been swapped for a Collett pattern 4000gal tender. Whereas the engine was in BR lined black livery, the tender was still in post-war GWR green, complete with coat of arms. No 7911 was photographed near Harbury, at the head of the 9.20am Birkenhead-Bournemouth express, with SR stock, on 10 April 1954./*T. E. Williams*

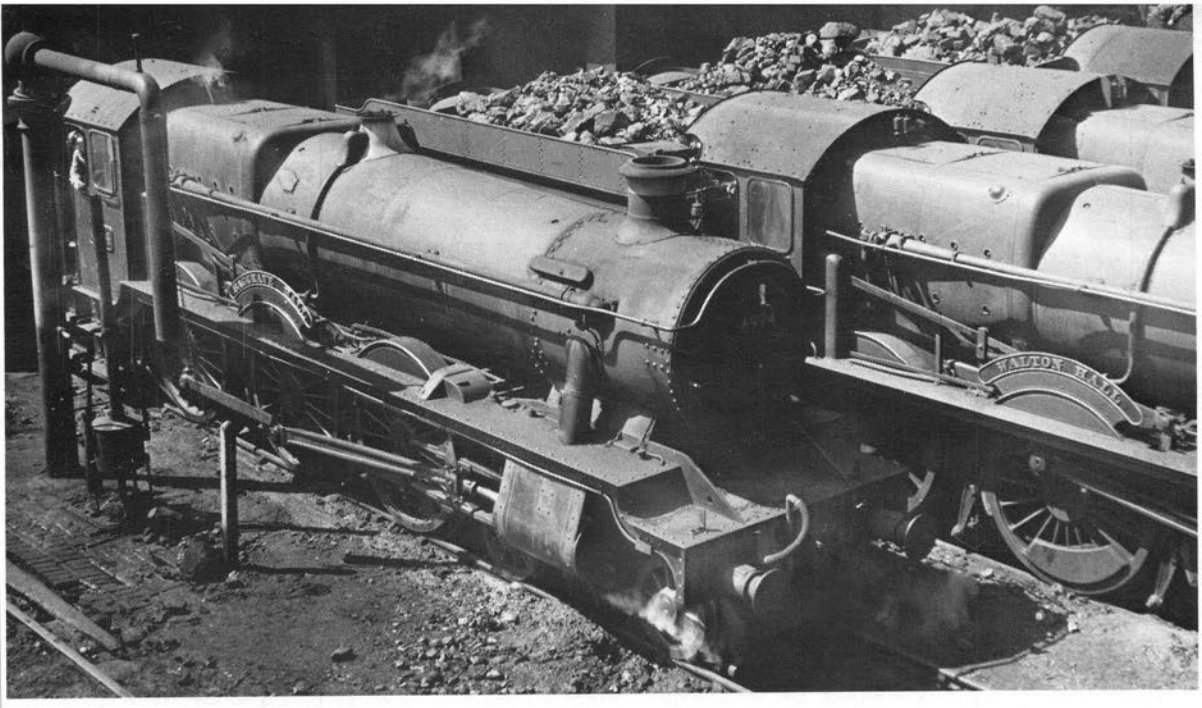
Below right: In early BR days, the 'Modified Hall' class was painted in lined black mixed-traffic livery, as seen here on No 7905 *Fowey Hall,* which received the livery when constructed, in March 1949. The engine makes a fine picture, working hard with the up Kensington milk train, at the site of the former Draw Wood Viaduct in the beautiful Glyn Valley, in Cornwall, on 18 April 1955./*Peter F. Bowles*

7911



Above: No 6971 *Athelhampton Hall* had received a Collett 4000gal tender by the time this picture was taken (it was the first one built with a Hawksworth tender.) Some of the 'Modified Halls' received improved draughting arrangements and had the letters ID painted at the front end, behind the bufferbeam. These engines had narrower chimneys, with straight sides and no capuchon, as seen here on No 6971, photographed with an up freight at Hatton on 29 September 1962. The engine is in fully lined BR green livery, applied to the class from the summer of 1955 onwards./*M. Pope*

Below: 'Modified Hall' class 4-6-0 No 6990 *Witherslack Hall,* photographed on shed at Reading, in the company of 'Manor' class 4-6-0 No 7817 *Garsington Manor.* This was another of the 'Modified Halls' which received improved draughting, with the new narrower chimney. This improvement was made only to the Hawksworth boilers of the 6959 series, but some of these boilers later found their way on to the earlier Collett 'Halls', with some modification to the outside steam pipes. This picture makes an interesting comparison to the picture of the same engine on page 94, which shows the original larger chimney and flat-sided tender it had when used for the 1948 Locomotive Exchange Trials./*J. R. Carter*



Above: Ready for the road at Cardiff Canton shed, No 6994 *Baggrave Hall,* alongside No 5918 *Walton Hall.* Note the absence of ventilators in the cab roofs, although Hawksworth fitted sliding ventilators to the 'County' class 4-6-0s. No whistle shield on No 5918; and No 6994 has improved draughting. */G. F. Heiron*

Below: The narrower chimney, and lack of capuchon, of the 'Modified Halls' with improved draughting, is emphasised in this striking picture of No 7929 *Wyke Hall,* pictured double-heading BR standard class 6 Pacific No 72008 *Clan MacLeod* with a Derbyshire Railway Society special, approaching Swan Village en route to Tyseley and Wolverhampton on 24 March 1963. No 7929 was the last of the Hawksworth 'Modified Hall' class to be constructed, at Swindon in November 1950, nearly a year after Mr Hawksworth's retirement./*G. England*

SECTION 15

1000 Class 4-6-0 2-cyl Mixed-Traffic Engines

Introduced: 1945
Total: 30
GWR Classification: D, Red with X*
BR Power Class: 6MT
'County'

During the final months of World War II rumour began to circulate amongst railway enthusiasts that Swindon was working on a revolutionary new design of large passenger engine. As so often happens in such circumstances, the rumours exceeded the reality, and when the new engine was unveiled to an eager audience, there was some disappointment felt when it proved to be nothing more than an enlarged two-cylinder 4-6-0! As such, it represented the final GWR development of Churchward's 'Saint' class of 1902.

The design did, however, include some new features which bore evidence of changing attitudes to locomotive design on the GWR. In particular there was the double blastpipe and chimney, the high boiler pressure and the completely non-standard coupled wheel diameter. In addition, a new design of tender was attached. Many components remained standard, and the general appearance of the finished locomotive (the first to appear from Swindon in fully-lined green livery since the cessation of hostilities) was unmistakeably Great Western — even to the extent of giving the large double chimney a copper cap!

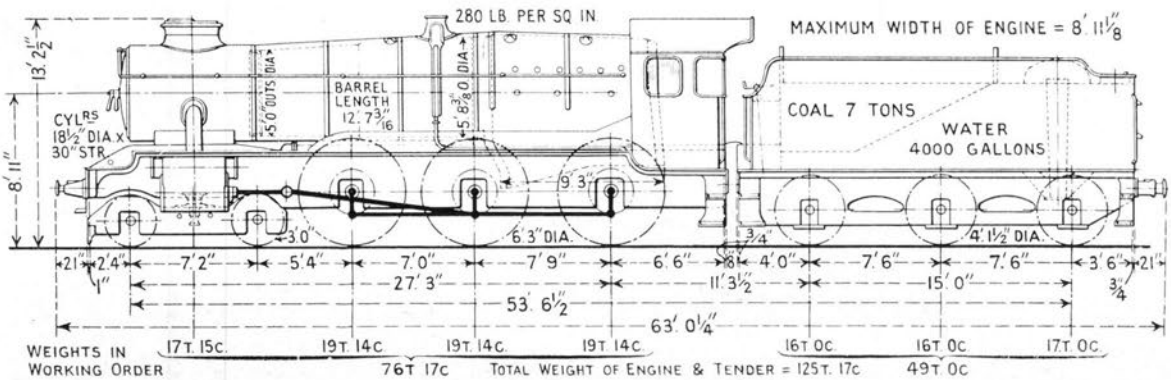
Hawksworth had enlarged the two-cylinder 4-6-0 to an engine roughly equivalent in power to the four cylinder 'Castle', but he did it as the expense of greatly increased hammer-blow. This together with the weight carried on the coupled wheels, 19tons 14cwt per axle, meant that the 'County' class was subject to restricted maximum speed on all routes over which it ran, except where the route was also available to the 'King' class. On the other hand, by using only two cylinders, he produced a most powerful engine more cheaply than was possible by adhering to the four-cylinder layout, and one, moreover, easier to maintain in the difficult working conditions of the immediate post-war period.

During World War II Swindon had built a quantity of LMS Stanier 8F 2-8-0s, as part of the war effort. When Hawksworth produced his new standard No 15 boiler for the 'County' class he made use of the existing flanging blocks from the Stanier 8F boiler for the firebox throat and backplates, but with modified staying to allow the higher working pressure of 280lb psi. This high working pressure was new to the GWR, but had been introduced to British practice some four years earlier by O. V. S. Bulleid with his 'Merchant Navy' class for the Southern.

The other important feature of the boiler was the provision of a hopper type of ashpan, which allowed for the quick removal of ashes at the sheds. Like his 'Modified Hall', which could be described as the starting point for the 'County' class design, Hawksworth used main frames of plate steel throughout, and the cylinders were cast separately. A fabricated

**The 'X' suffix denoted some overloading was permitted. When No 1000 was new it carried E, Red classification.*

Below: The drawing depicts the first engine, No 1000, in as-built condition, with large double chimney and blastpipe.



steel saddle supported the smokebox and front end of the boiler. The appearance of the front end was generally similar to that of the 'Modified Hall', with a plate frame bogie.

A completely new design of tender was introduced for these engines, of much simplified appearance and easier construction, with the tanks built up entirely by welding. The capacity was 7tons of coal and 4000gal of water, and the weight in full working order was 49tons. Tenders of this type were also built for later examples of the 'Modified Hall' and 'Castle' classes, in slightly modified form.

The principal dimensions of No 1000, as built, were as follows: two cylinders of 18½in diameter by 30in stroke; coupled wheels of 6ft 3in diameter; tube heating surface of 1545sq ft, firebox heating surface of 169sq ft and superheater heating surface of 265sq ft, giving a combined total of 1979sq ft. The grate area was 28.84sq ft, and the tractive effort at 85%, was 32 580lb. Alterations were later made to the superheater elements which reduced the superheating surface to 248sq ft, and the combined total heating surface to 1962sq ft. In 1956 the decision was taken to reduce the boiler pressure to 250lb; this reduced the tractive effort to 29 090lb.

The engines were built as follows:

Nos 1000-1029	Swindon	1945-47

Hawksworth had intended to number the locomotives in the 9900 series, but he changed this to the 1000 series after information had been prematurely 'leaked' to an enthusiast journal. The names were applied to the first sixteen engines after they had run for a period of some months without nameplates.

In retrospect the 'County' class cannot be seen as entirely successful, within the story of GWR steam locomotive development. It has been suggested that Hawksworth intended the design to be a precursor for greater things, perhaps in the form of a Pacific with 6ft 3in diameter wheels and 280lb boiler pressure. On the other hand, many seasoned Swindon men will observe that there was no real need for such an engine on GW metals. Indeed, the latter-day improvements to the 'Castle' and 'King' class 4-6-0s by S. O. Ell produced locomotives ideal for their rosters and it is doubtful if the heavier and more costly Pacific could have outshone them, had it ever materialised. The fact that only 30 'Counties' were ever built, whereas construction of the Collett 'Castle' class and 'Modified Hall' class continued at Swindon *after* their appearance, suggests that Hawksworth was receptive to criticism of his new design. In their original

Below: 'County' class 4-6-0 No 1000 *County of Middlesex* photographed in original condition, with full post-war GWR livery, and large double chimney, but after the addition of the nameplates on 6 July 1946. Nos 1000-1018 were delivered without names. The engine was not a good performer in this state, as the draughting of the double chimney and blastpipe was incorrectly proportioned. No 1000 was photographed whilst working the down 5.13pm Weston-super-Mare express, at Twyford; composed of 'Centenary' stock except for the last carriage./*M. W. Earley*

Above: From No 1001 onwards, the engines were built new with single blastpipe and chimney, the latter very similar to the chimney of the 'King' class in appearance. No 1007 was photographed prior to receiving nameplates near Cholsey with a down Plymouth express. The single continuous splasher over the coupled wheels was very similar to the design applied by Collett to his semi-streamlined 'King' and 'Castle' 4-6-0s (see pages 22 and 45.) Hawksworth introduced a new pattern of flat-sided tender for these engines, of 4000gal, 7tons coal capacity./*M. W. Earley*

Below: Again seen in original condition, this second view of No 1007 illustrates the right-hand side of the engine before the addition of nameplates and clearly shows the reversing rod, outside the long splasher. A peculiar feature of the Hawksworth 'County' class 4-6-0s was the footstep on the front, immediately alongside the right-hand buffer. The engines had plate frames throughout, including those for the bogie. No 1007 was photographed on 9 March 1946, at the head of an up milk train, on Goring Troughs./*M. W. Earley*

Above: Early in 1954, the pioneer 'County' class 4-6-0 No 1000 *County of Middlesex,* fitted with the original double blastpipe and chimney, was given thorough testing by Swindon, on the stationary test bed and on road trials with the Dynamometer car. The engine is seen here, in early BR livery of lined black, whilst engaged on the road trials, fitted with front-end indicator shelter, cage over the coal space on the tender, and hauling 14 coaches including the Dynamometer car.*/Ivo Peters*

Below: Also in early BR livery of mixed-traffic lined black, No 1004 *County of Somerset* was photographed at Stratford-upon-Avon, on 26 May 1953, hauling a lightly loaded first portion of the Penzance-Wolverhampton 'Cornishman'. The left-hand nameplate on the 'County' class was attached directly to the splasher, whereas the right-hand one stood proud, on a backplate, as can be clearly seen in the next illustration. */T. E. Williams*

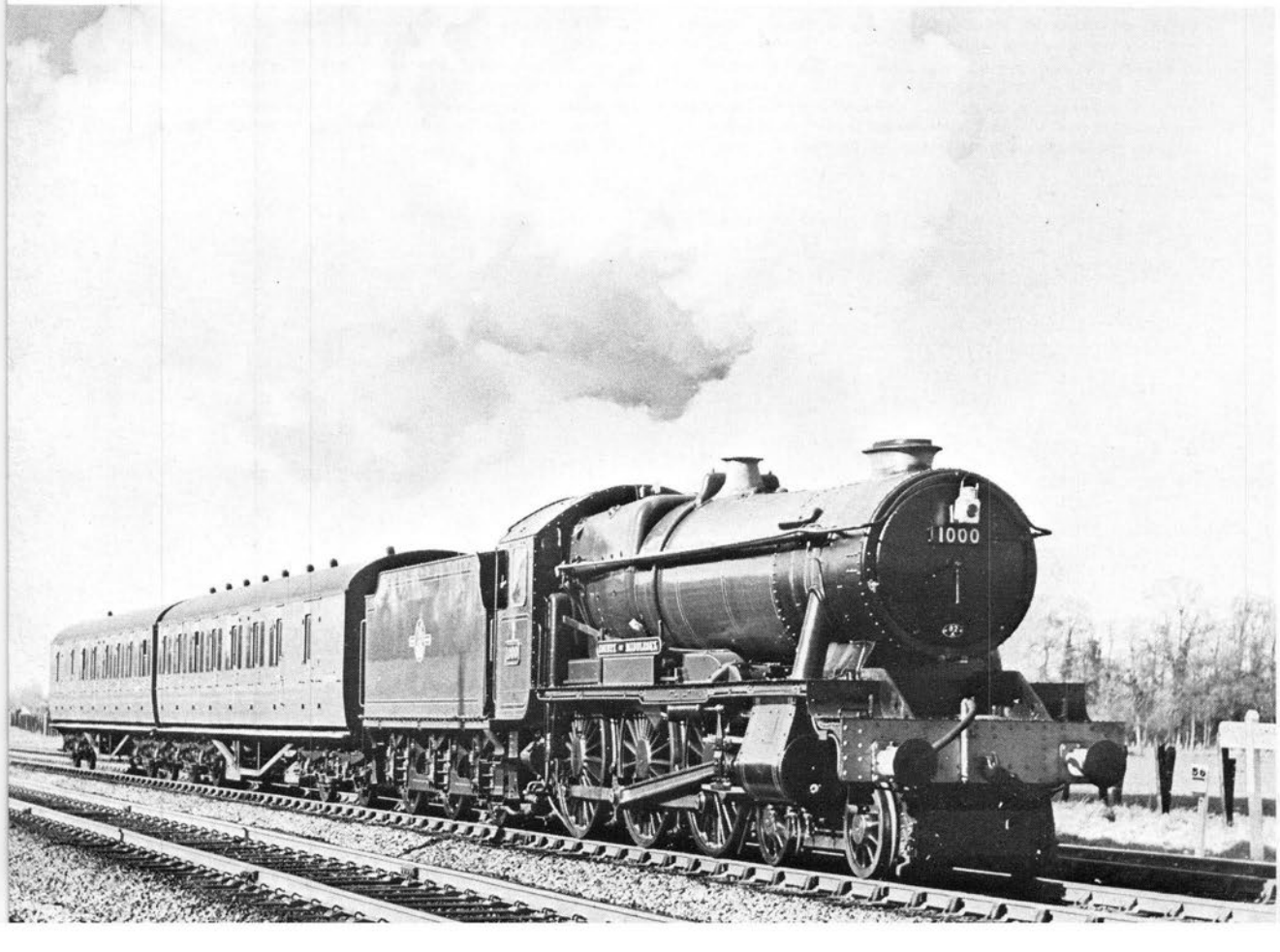
form they were prone to poor steaming and were criticised for the very pronounced fore-and-aft surging motion they could impart to the leading carriages of a train. When employed on similar duties to those of the 'Castles' they did not exhibit such free running at high speeds as the four-cylinder engines. The Civil Engineer remained critical of the heavy hammer blow effect they had upon the track.

A marked improvement was made to the efficiency and performance of the 'County' class 4-6-0s in the period from 1956 to 1959, when they all received new double blastpipes and chimneys to proportions worked out by S. O. Ell following his extensive trials with various locomotive types at Swindon. Despite this, the class did not survive until the end of steam working on the Western Region, and always remained 'odd-men-out' in the eyes of many footplatemen.

First of class withdrawn: 1003/7/22 (1962).
Last of class withdrawn: 1011 (1964).
None preserved.

Below: Following the trials with No 1000, fitted with the original double chimney and blastpipe, Swindon fitted No 1009 *County of Carmarthen* with a shorter double chimney (at first of simple stovepipe design) which proved more successful on trials. Eventually the whole class was fitted with copper cap double chimneys of this squat type, seen here on No 1000 *County of Middlesex.* The engine is pictured whilst running-in from overhaul at Swindon, on 16 February 1960, with a two-coach Didcot stopping train, and the 'County' positively sparkles in a new application of fully lined BR green livery./*J. A. Coiley*

Right: Although the new short double chimney undoubtedly improved the efficiency of the 'County' class 4-6-0s, it did not enhance their appearance! No 1013 *County of Dorset* clearly demonstrates their final squat front end aspect as the engine leaves Chester on a Birkenhead-Paddington express in August 1963./*J. R. Carter*



1013

SECTION 16

9400 Class 0-6-0PT Heavy Shunting Tank Engines

Introduced: 1947
Total: 210
GWR Classification: C, Red
BR Power Class: 4F

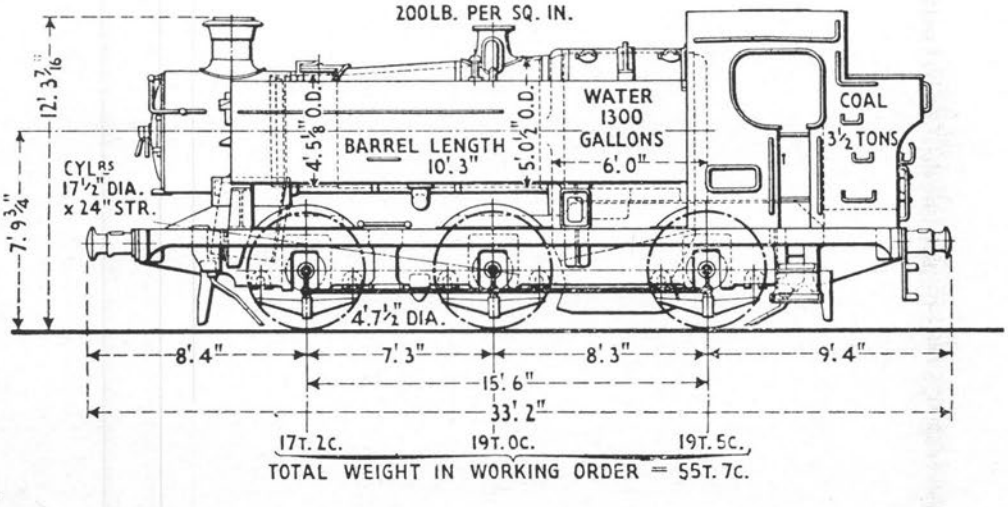
When further engines of the stalwart 5700 class 0-6-0PT (the 8750 class version) were requested by the Running Superintendent, Hawksworth at first agreed, and submitted the request to the General Manager in the annual locomotive building programme, with a diagram of the class attached. Sir James Milne insisted that any new construction should be along more modern lines, and Hawksworth then agreed to modify the design, to produce the 9400 class, with a standard No 10 taper boiler and a drumhead smokebox. This could be described as the pannier tank version of the Collett 2251 class 0-6-0 tender engines, whereas the 5700 class was related more to the Dean 2301 class.

In retrospect the modification was not altogether satisfactory, and it might have paid all concerned dividends to have held out for further examples of the 8750 design, because the new 9400 proved to have some in-built disadvantages over the previous Collett engines. In particular the width overall of the cab was increased, due to the taper firebox of the standard No 10 boiler, and this made the driver's controls less easy to reach whilst engaged in shunting operations, when he was constantly looking out of the cab side. (Some modifications were later made to cab fittings to answer the endless complaints about this.) No less of a problem to the Running people was the fact that the larger boiler increased the total (and the axle) weight of the engines and thereby reduced their route availability. They also proved more complicated to build than the earlier design, and firebox repairs took more time to carry out. However, despite these disadvantages, the 9400 class proved useful as heavy shunting engines and BR decided to continue their construction pending a final decision on a switch to dieselisation for all shunting duties. Only the first 10 locomotives were actually built by the GWR at Swindon; all the rest were constructed under BR auspices.

Leading dimensions of Nos 9400-9409 were as follows: two inside cylinders of 17½in diameter by 24in stroke driving on to coupled wheels of 4ft 7½in diameter; superheated standard No 10 boiler with a tube heating surface of 1069.42sq ft, a firebox heating surface of 102.40sq ft and a superheater heating surface of 74.00sq ft; giving a total of 1245.82sq ft; the grate area was 17.4sq ft, and boiler pressure was 200lb; tractive effort (at 85%) was 22 515lb.

A further 200 locomotives were built, without superheaters, by outside contractors (although Swindon supplied some of the

Below: 9400 class 0-6-0PT, for heavy shunting duties.



boilers). This altered the following dimensions: tube heating surface 1245.7sq ft and firebox heating surface 101.7sq ft, giving a revised total of 1347.4sq ft.

The engines were built as follows:

Nos 9400-9409	Swindon	1947
Nos 9410-9459	R. Stephenson	1950-51
Nos 9460-9489	R. Stephenson	1951-53
Nos 8400-8449	Bagnall & Co.	1949-54
Nos 8450-8479	Yorkshire Engine Co.	1949-52
Nos 8480-8499	R. Stephenson	1952
Nos 9490-9499	Yorkshire Engine Co.	1954-55
Nos 3400-3409	Yorkshire Engine Co.	1955-56

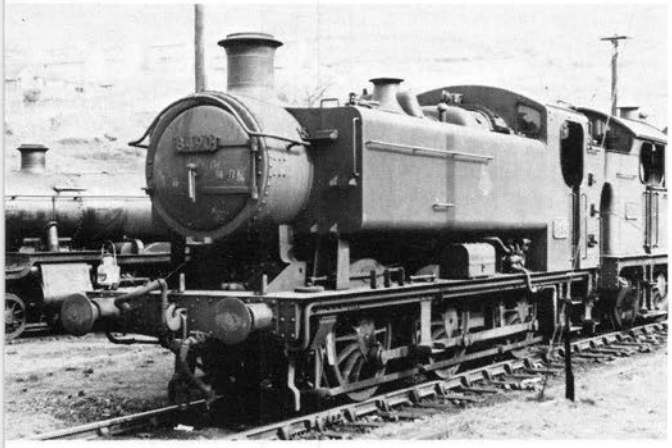
Of the engines built by Robert Stephenson & Hawthorns Ltd, Nos 9410-9489 were constructed at their Newcastle Works, and Nos 8480-8499 were constructed at their Darlington Works; the latter being under sub-contract from Hudswell Clarke & Co Ltd. Nos 9490-9499, 3400-3409 were built by the Yorkshire Engine Co as sub-contractors to the Hunslet Engine Co.

Because BR were examining the possibility of a complete changeover to diesels for shunting duties, the life expectancy of the 9400 class was short from the outset, and all were withdrawn whilst having many years of useful life left in them, with extremely low mileages in some cases.

First of class withdrawn: 8417 (1959).
Last of class withdrawn:* 8403/15/20/33/5/59/71/81/4/6/98, 9404/5/11/5/8/30/7/63/4/77/95 (all 6/1965).
Examples preserved: 9400, 9466.

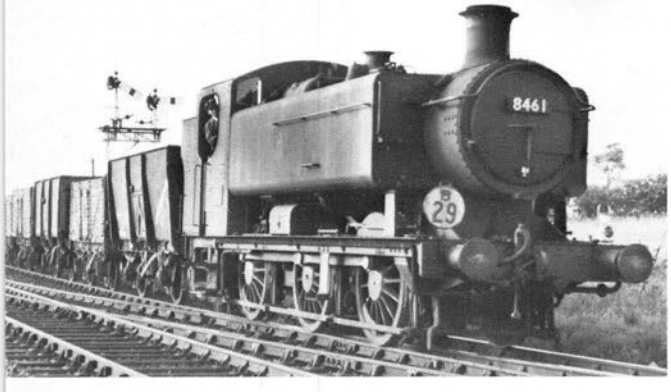
**No 9480 was withdrawn from BR stock in April 1965, but subsequently used by the firm of contractors lifting part of the former R&SB line, in 1966. No 9424 was similarly used after BR withdrawal, on open cast coal sites, for a year or so. Four locomotives, Nos 8466-97, 9425-57, were selected for use as stationary boilers after their withdrawal; surviving in this form for some three years or so.*

Below: The first 10 engines built, Nos 9400-9409, were at first superheated and were finished in plain green GWR livery. No 9405 of this batch is seen in later livery of unlined BR black, at Old Oak Common shed. These were the last engines built by the GWR before nationalisation. Their rather austere and angular finish (with extensive use of welding) was offset to some degree by the application of a handsome copper-capped chimney. The wider cab was flush with the pannier tanks and bunker sides. One design change which made life easier for the footplatemen was the substitution of underhung springs on the trailing wheels, which eliminated the nests of coil springs on the footplate itself. No whistle shields were fitted. Automatic Train Control apparatus was standard for the class./*Alec Swain*



Top left: 9400 class 0-6-0PT No 8490, one of a batch built by Robert Stephenson & Hawthorns Ltd, at Darlington in 1952; photographed at Duffryn Yard on 13 May 1962. Stephenson's association with the GWR spanned the entire steam era; they had built the first locomotives for the company in 1835, whilst the 9400s were among the last. Use of the 9400 class was restricted by their greater weight, compared to the versatile 5700/8750s, and they found greater acceptance in shunting yards than on branch lines. One engine, No 9401, was loaned to the Eastern Region for trials in 1957 and allocated to Stratford for use in Temple Mills yards./*A. W. Martin*

Centre left: No 8461, built by the Yorkshire Engine Co in 1950, was photographed at the head of an up coal train at Llantwit Major, on former Barry Railway tracks, in August 1957. The 9400 class were sturdy and powerful engines, but the duties for which they were best suited were destined to be the exclusive province of the 350hp diesel-electric shunter under BR modernisation plans. A minor detail of some of the engines built by contractors was that the lip of the copper-capped chimney was sharper in profile than the original Swindon version, as can be seen on this engine./*P. Ransome-Wallis*



Below: In January 1957 Nos 8400-8406 were transferred to the London Midland Region, for banking duties on the Lickey Incline; they were shedded at Bromsgrove. LMR pattern continuous blow-down valves were fitted, together with LMR lampbrackets. By the time this picture was taken, in June 1964, the allocation had altered somewhat and Nos 8405, 9493, 8418 and 8402 make up the quartet seen banking a freight hauled by 'Jubilee' class 4-6-0 No 45670 *Howard of Effingham.* /*Anthony A. Vickers*

Right: 9400 class 0-6-0PT No 9450 makes hard work of shunting duties at Reading shed, on a crisp morning. This engine carried a whistle shield, unlike the others illustrated in this section./*Gerald T. Robinson*

9450

SECTION 17

1500 Class 0-6-0PT Heavy Shunting Tank Engines

Introduced: 1949
Total: 10
WR Classification: C, Red
BR Power Class: 4F

Hawksworth produced a striking departure from the established Swindon pannier tank concept when he designed the 1500 class, especially intended as a 24-hour shunter, which would not require to go over a pit for oiling. To achieve this he used outside cylinders and Walschaerts valve gear with 8in piston valves. The wheelbase was short, at 12ft 10in, to allow the engines to be used in sidings and yards, over sharp curves. The leading dimensions were similar to the 9400 class, without superheating, but their range of acitivities was restricted by the large overhang at each end of the short coupled wheelbase, and unlike the 9400s, they could not be used on passenger workings or at any but moderate speed out on the line, as they were unsteady in such circumstances.

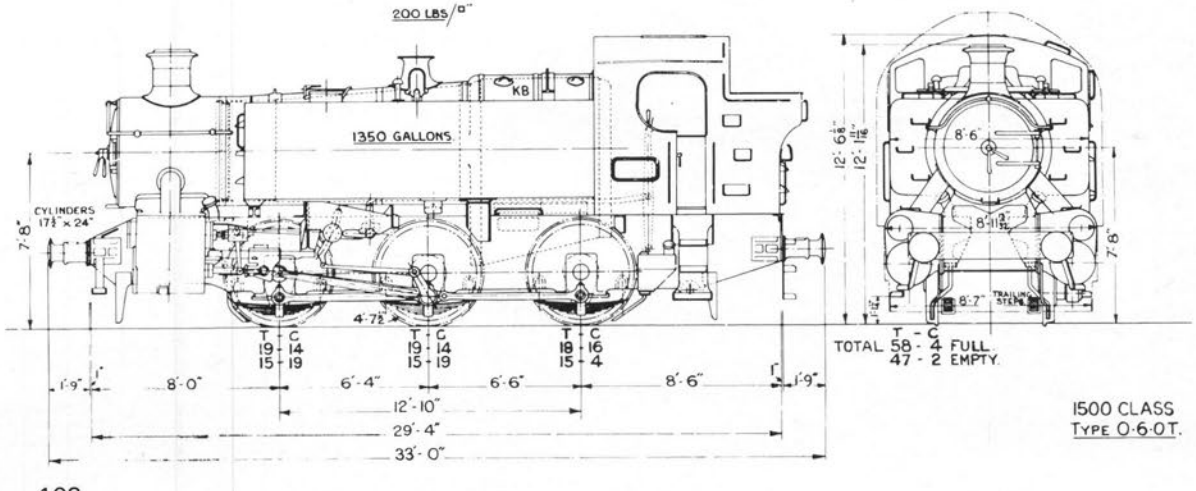
Only 10 locomotives were constructed, and these were delivered after nationalisation, during Hawksworth's final year in office. The decision not to build any further examples of the type was most probably due to the success of the 350hp diesel-electric shunter, which BR introduced in large numbers to supersede steam for these humdrum, but important duties. The 1500s were well-liked and performed admirably, but they came too late in the day to have much impact upon WR steam operations.

Despite their austere appearance, with a lack of running boards, platforms and splashers, the 1500 class was the heaviest 0-6-0PT built for the Great Western, at 58tons 4cwt in full working order. Their leading dimensions were as follows: the cylinders were 17½in diameter by 24in stroke, driving coupled wheels of 4ft 7½in diameter; the non-superheated standard No 10 boiler had a total

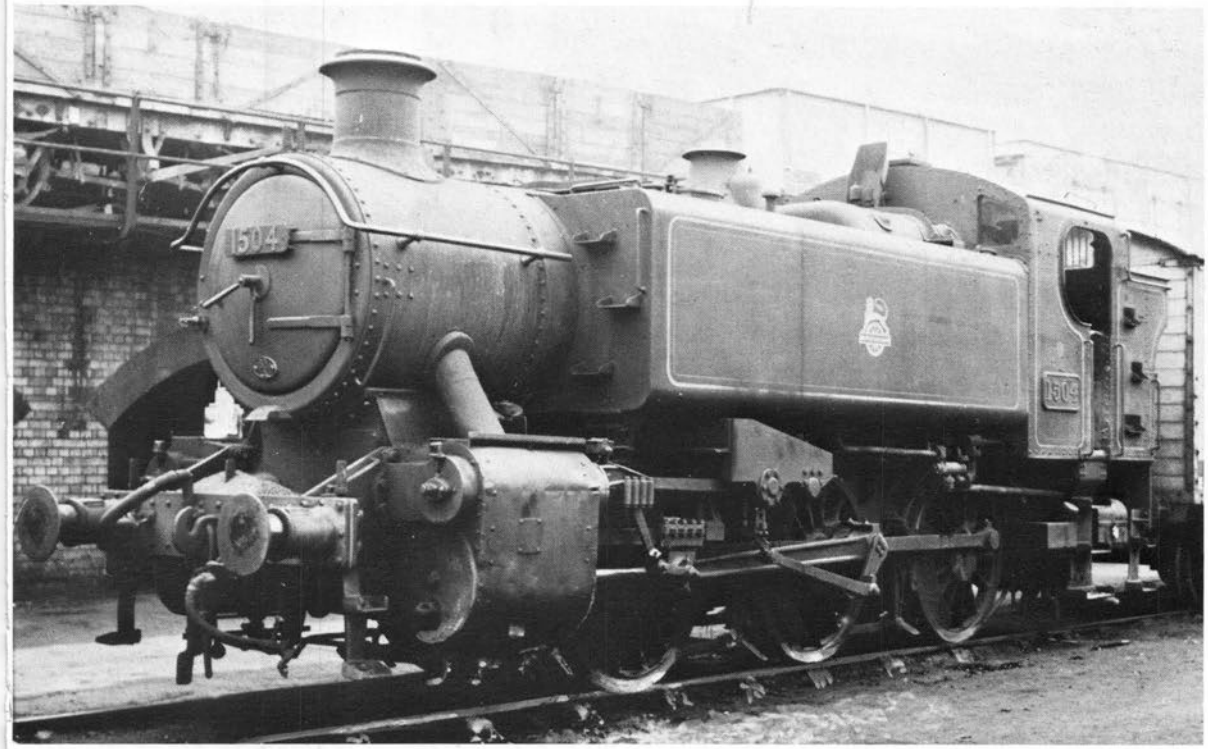
Below: 1500 class 0-6-0PT for heavy shunting duties. The diagram clearly illustrates the short coupled wheelbase and the resulting overhang at each end.

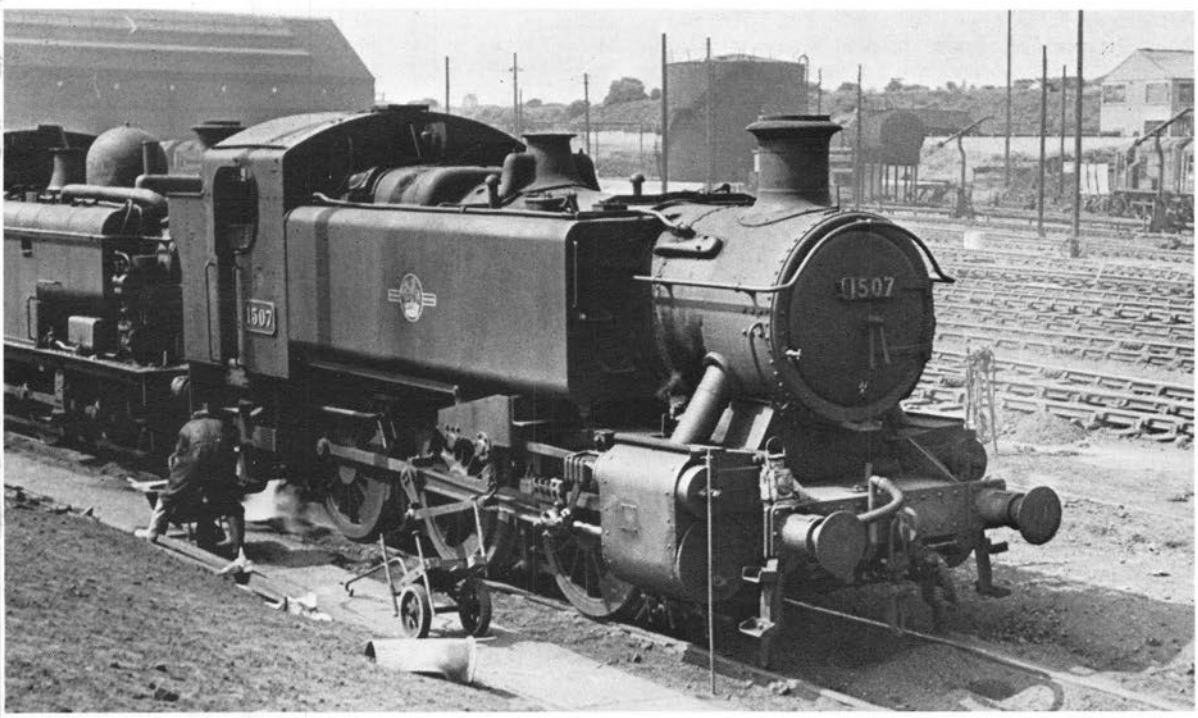
Above right: Delivered in 1949, the 1500 class never carried GWR livery or insignia. Only 10 engines were built, and Nos 1500-1505 were sent new to Old Oak Common where they were usually employed on empty carriage duties to and from Paddington. Three received fully lined BR black livery in the period 1953/4, Nos 1503/4/5, and No 1504 is seen here at Old Oak on 17 November 1957. Their austere appearance was emphasised by the lack of platforms, running boards or splashers. Note the snifting valve to the rear of the outside steampipe; single bar crosshead; short combination lever in the Walschaerts valve gear, and padlocked toolbox below bunker. A wide cab was fitted, similar to the 9400 class, which they closely resembled above footplate level./*C. P. Boocock*

Below right: In later BR black livery, No 1507 receives routine attention at Old Oak Common sheds, in the company of a condensing pannier tank. The 1500 class was designed as a 24hr shunting engine which did not need to go over a pit for oiling, but could be oiled from the ground. The wheelbase was very short, at 12ft 10in, so that sharp curves of 3 chain radius could be safely taken at slow speed. Quite extensive use was made of welding in the construction of their parts, instead of rivets, including the pannier tanks./*Alec Swain*



1500 CLASS
TYPE 0-6-0T.


1504
1504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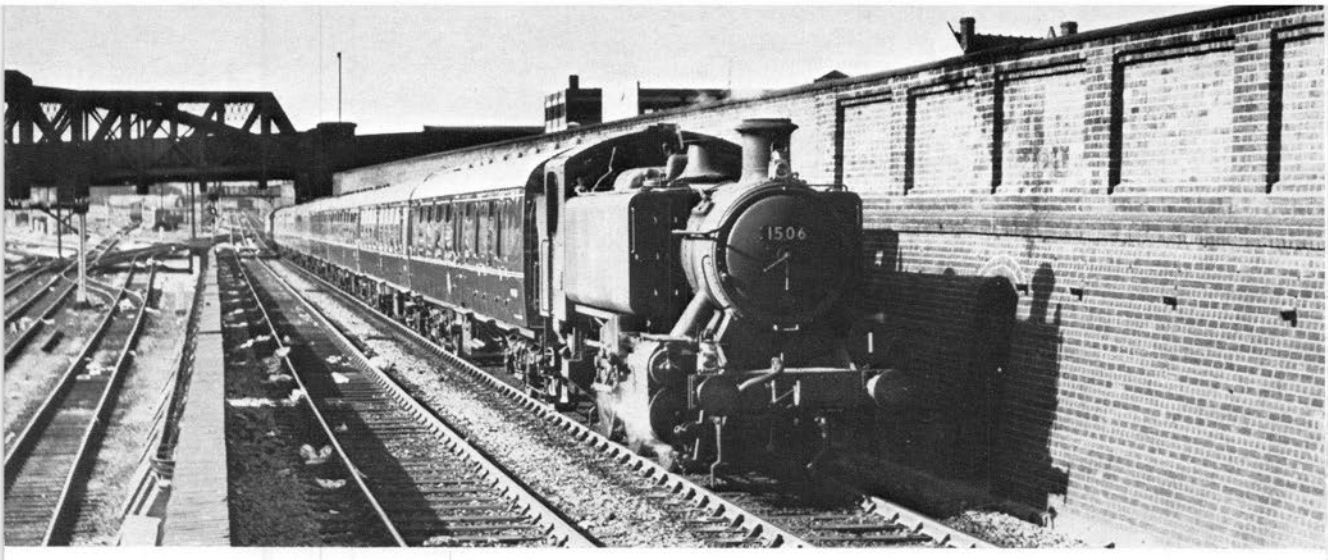


heating surface of 1347.40sq ft, comprising a tube heating surface of 1245.70sq ft and a firebox heating surface of 101.70sq ft; the grate area was 17.40sq ft and boiler pressure was 200lb; tractive effort (at 85%) was 22 515lb.

The engines were built as follows:

Nos 1500-1509 Swindon 1949

After only 10 years in BR stock, No 1509 was sold in working order to the National Coal Board for service at their Coventry Colliery, followed two years later by Nos 1501-2. These remained in use longer than the examples retained by BR, and one has survived for preservation.

Although there is little direct evidence, it seems possible that Hawksworth was influenced by the design of the USA Transportation Corps 0-6-0Ts, which saw some brief service on the GWR during World War II (some were later taken in SR stock for use at Southampton Docks), in particular in the adoption of outside Walschaerts valve gear and a short coupled wheelbase, with lack of platforms. The two designs were outwardly quite similar.

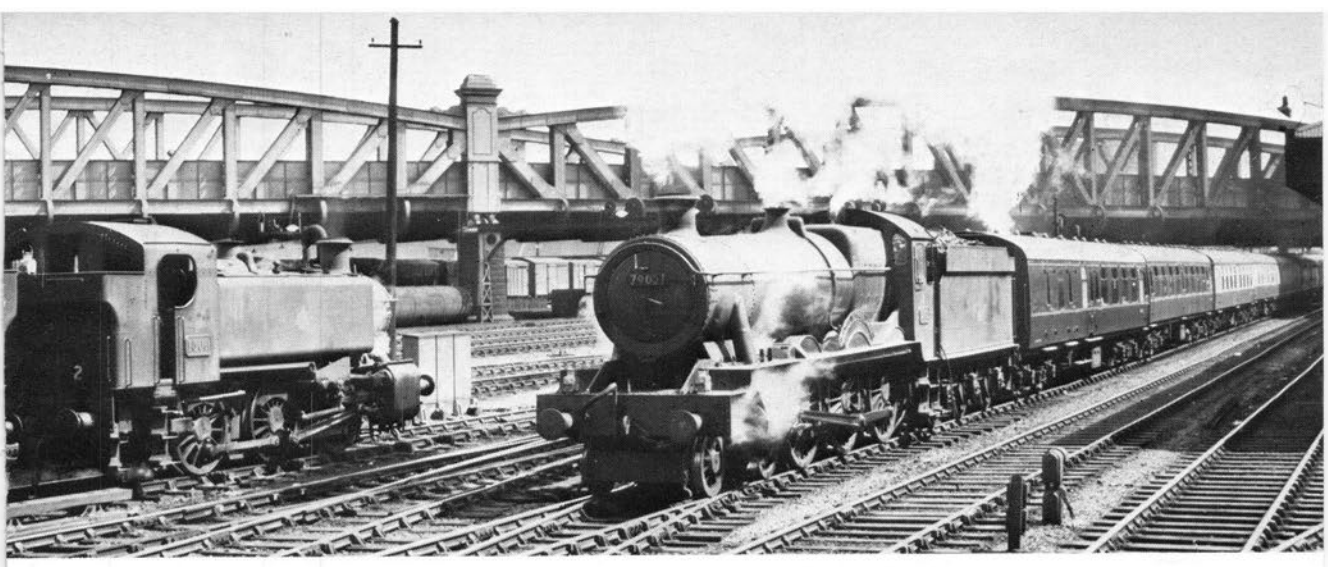
First of class withdrawn:* 1505 (1962).
Last of class withdrawn: 1500, 1503 (1963).
Example preserved: 1501*.

** Nos 1509, 1501-2 were taken out of stock in 1959 and 1961 respectively, but continued to operate until 1969 in NCB ownership. Nos 1502/9 were cut-up in October 1970.*

Above: Empty coaching stock from Old Oak Common sidings (visible beyond the overbridges) in the charge of 1500 class 0-6-0PT No 1506, seen tackling the climb to the flyover, bound for Paddington on 19 October 1963. The short wheelbase, and large overhang, meant that the 1500 class was unsuitable for running at any speed, but they were powerful engines and could tackle lengthy trains of empty coaches with apparent ease, whilst keeping to very moderate speeds./*Gerald T. Robinson*

Above right: No 1500 awaits the next spell of duty, outside Paddington station, as 'Modified Hall' 4-6-0 No 7902 *Eaton Mascot Hall* leaves with the 12.05pm for Plymouth. The fuel capacity of the 1500 class was large for an engine of that size, with 1350gal of water and 3tons 6cwt of coal, resulting in a total weight in working order of 58tons 4cwt, compared to 55tons 7cwt for the 9400 class and approximately 49tons for the 5700 class./*R. C. Riley*

Below right: Three engines of the class were sold out of service to the National Coal Board, for use at their Coventry Colliery, in 1959/61. These were Nos 1501/2/9. Two survived until 1970 (Nos 1502/9), whilst No 1501 was rescued for preservation and is now on the Severn Valley Railway, at Bridgnorth. The NCB did not renumber the Hawksworth engines and the cabside numberplates were retained. A maroon livery was applied and the engines were fitted with spark-arresters on the chimney. No 1502 makes a spirited start away from Three Spires Junction yard with coal empties for Keresley Colliery on 20 June 1969. Steam working at the Colliery ceased the following November./*Allan Stewart*



SECTION 18

1600 Class 0-6-0PT Light Passenger & Shunting Tank Engines

Introduced: 1949
Total: 70
WR Classification: A, Uncoloured
BR Power Class: 2F

The final locomotive design by Hawksworth for the GWR was the 1600 class 0-6-0PT; a modest light shunting engine intended to replace life-expired engines of the old 2021 class. The first engine did not appear until 1949, after nationalisation, and in retrospect it is somewhat surprising that authority was obtained for further construction as late as 1955, by which time diesel shunters were being introduced by BR on a large scale. It was not long before the new 1600 class engines were being superseded by diesels, and withdrawals took place when the engines had many years of useful life left in them. Nevertheless they filled a useful gap in the motive power stock, created by the scrapping of their aged counterparts.

The design of the 1600s was intentionally modest, kept within a loading gauge which enabled them to be used on lines with restricted clearances in the form of low overbridges, in yards or docks with sharp curves, and sidings with reduced clearances; etc. In view of this, examples were used on mineral branches and in areas where the larger pannier tanks were prohibited.

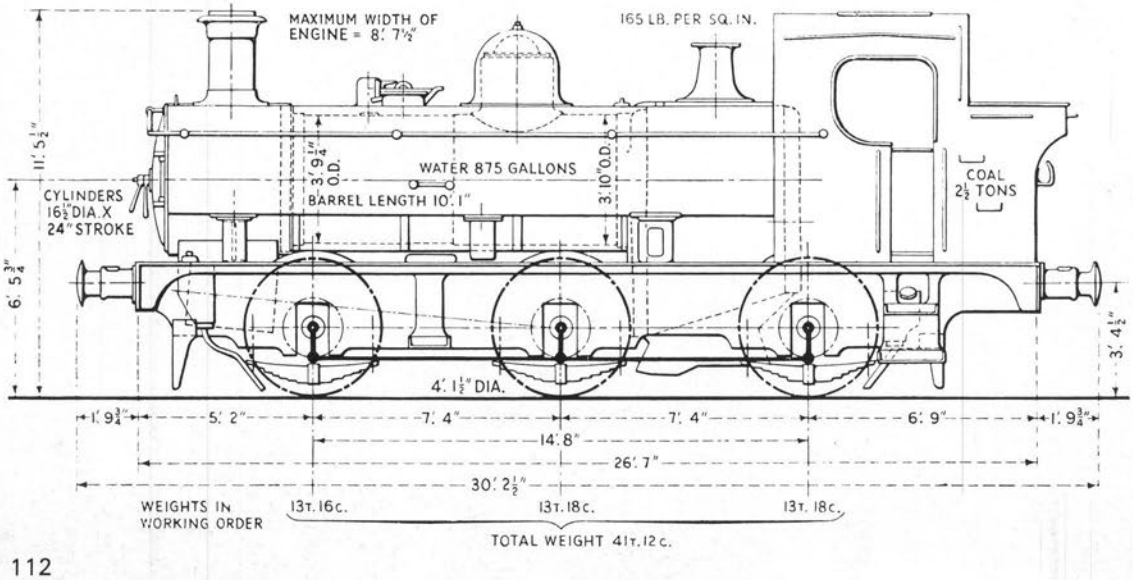
The leading dimensions were as follows: two inside cylinders of 16½in diameter by 24in stroke driving on to coupled wheels of 4ft 1½in diameter; the non-superheated standard No 16 boiler had a total heating surface of 956.7sq ft, comprising a tube heating surface of 877.2sq ft and a firebox heating surface of 79.5sq ft; the grate area was 14.9sq ft and boiler pressure was 165lb; tractive effort (at 85%) was 18 515lb.

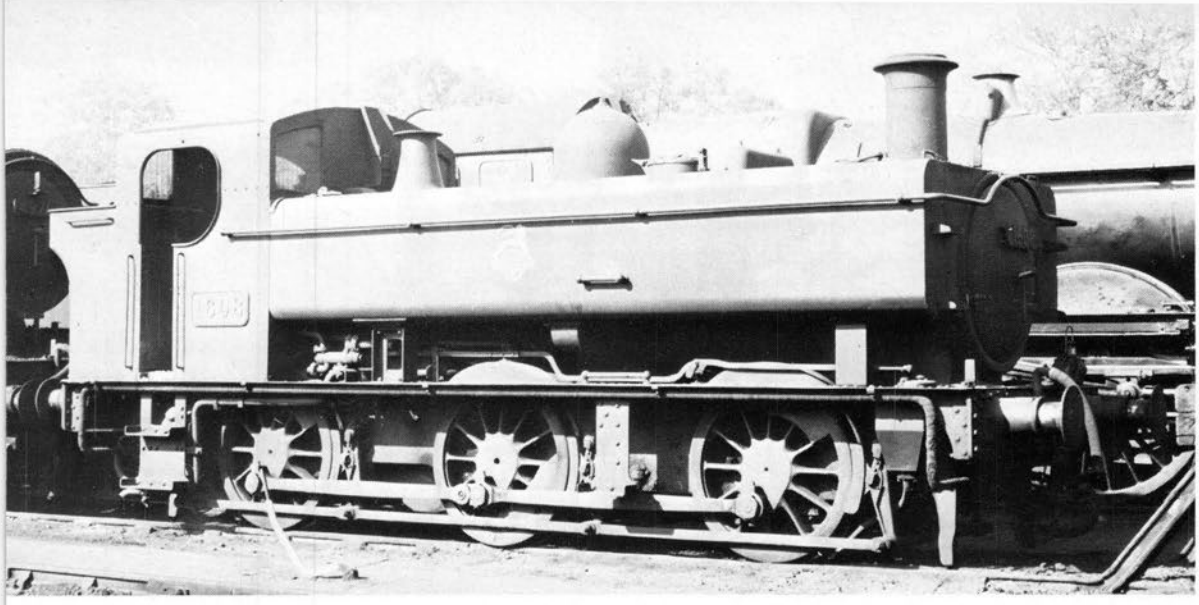
The engines were built as follows:

Nos 1600-1619	Swindon	1949
Nos 1620-1629	Swindon	1950
Nos 1630-1649	Swindon	1951
Nos 1650-1669	Swindon	1954-5

With the construction of No 1669 in May 1955 a lengthy tradition of GWR steam locomotive practice ended at Swindon, as from then on only BR standard steam was built there. The 1600 class were the last new steam 0-6-0T shunters built for service on British Railways, and henceforth the diesel

Below: 1600 class 0-6-0PT, for light passenger and shunting duties.





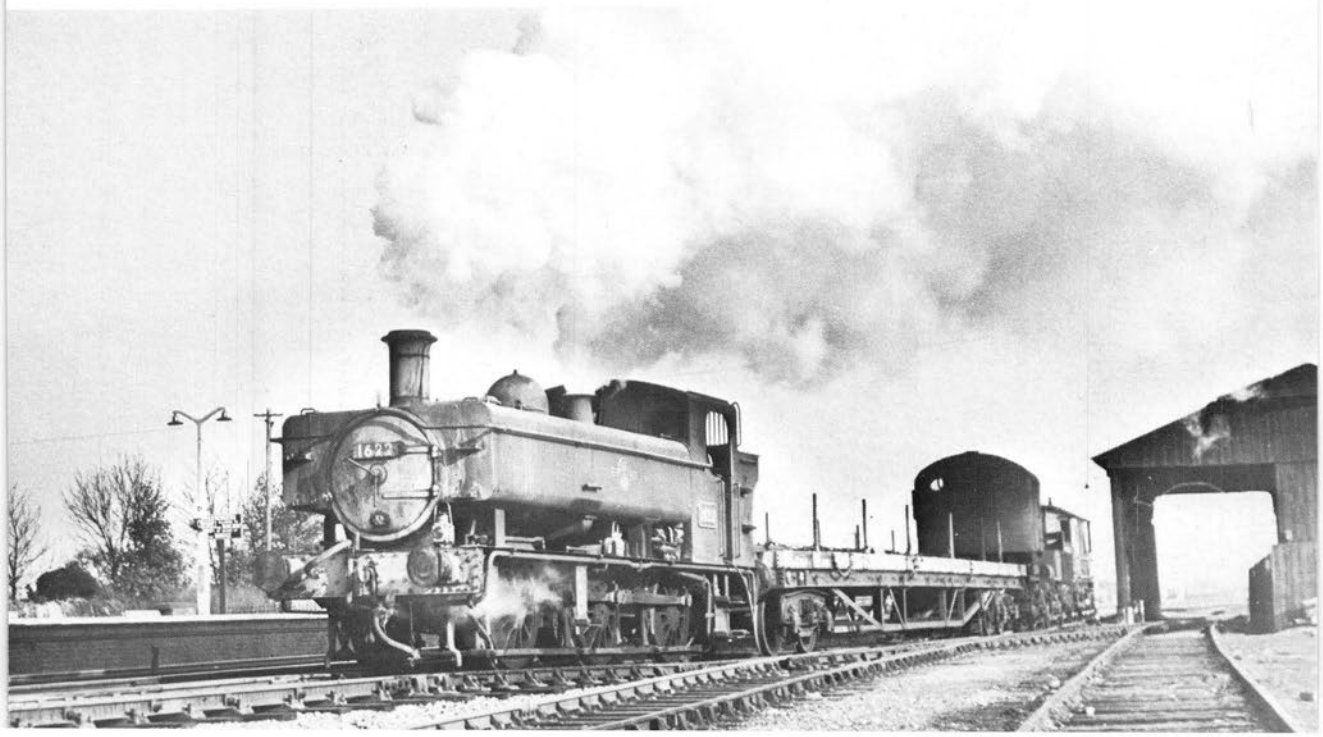
took over this area of motive power operations in new building programmes.

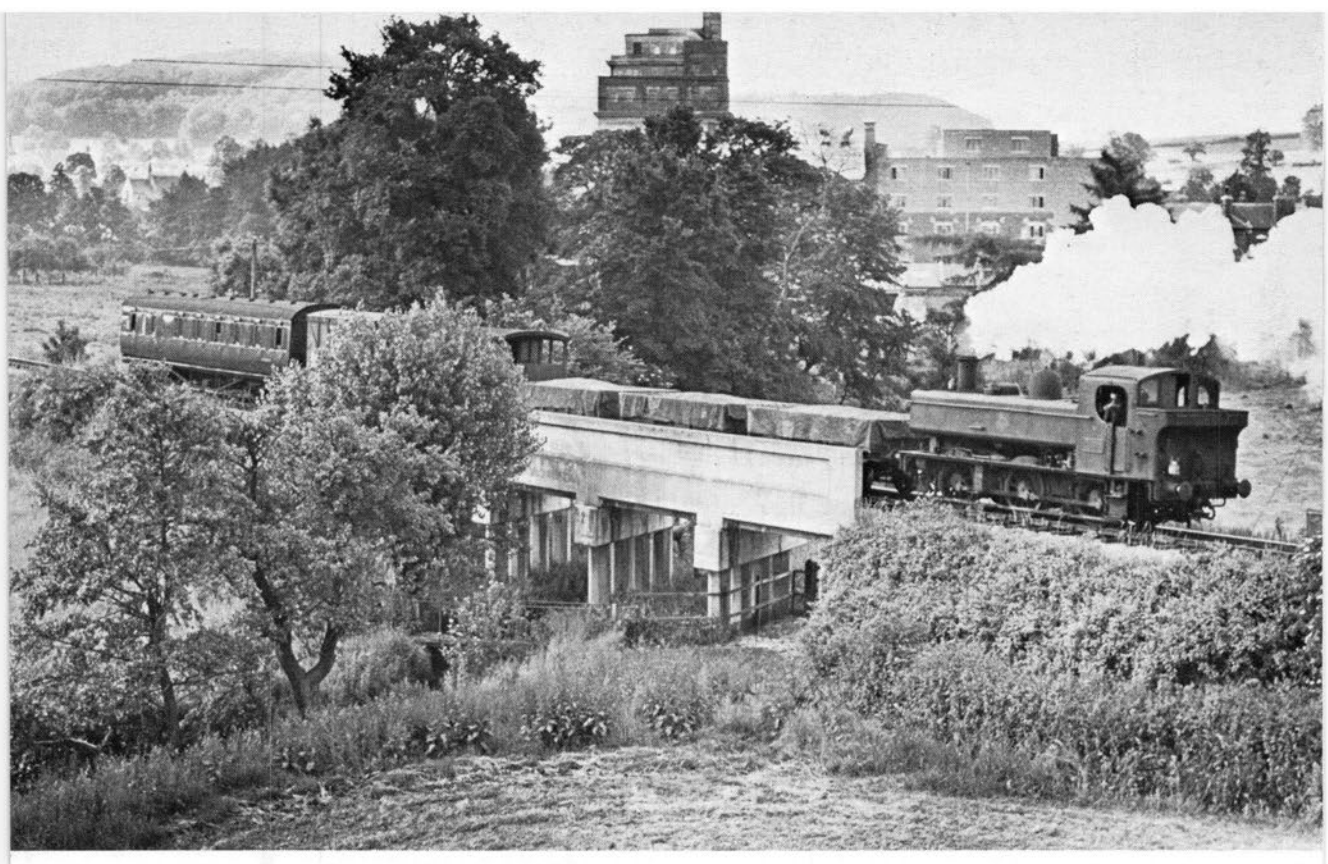
First of class withdrawn:* 1603 (1959).
Last of class withdrawn: 1628 (1966).
Example preserved: 1638.

**No 1600 was sold out of service, in working order, to the National Coal Board in July 1959. It ran at Risca and Nine Mile Point before being sold for scrap in January 1963. No 1607 was also sold to the NCB, in September 1965, and was scrapped by them in January 1969.*

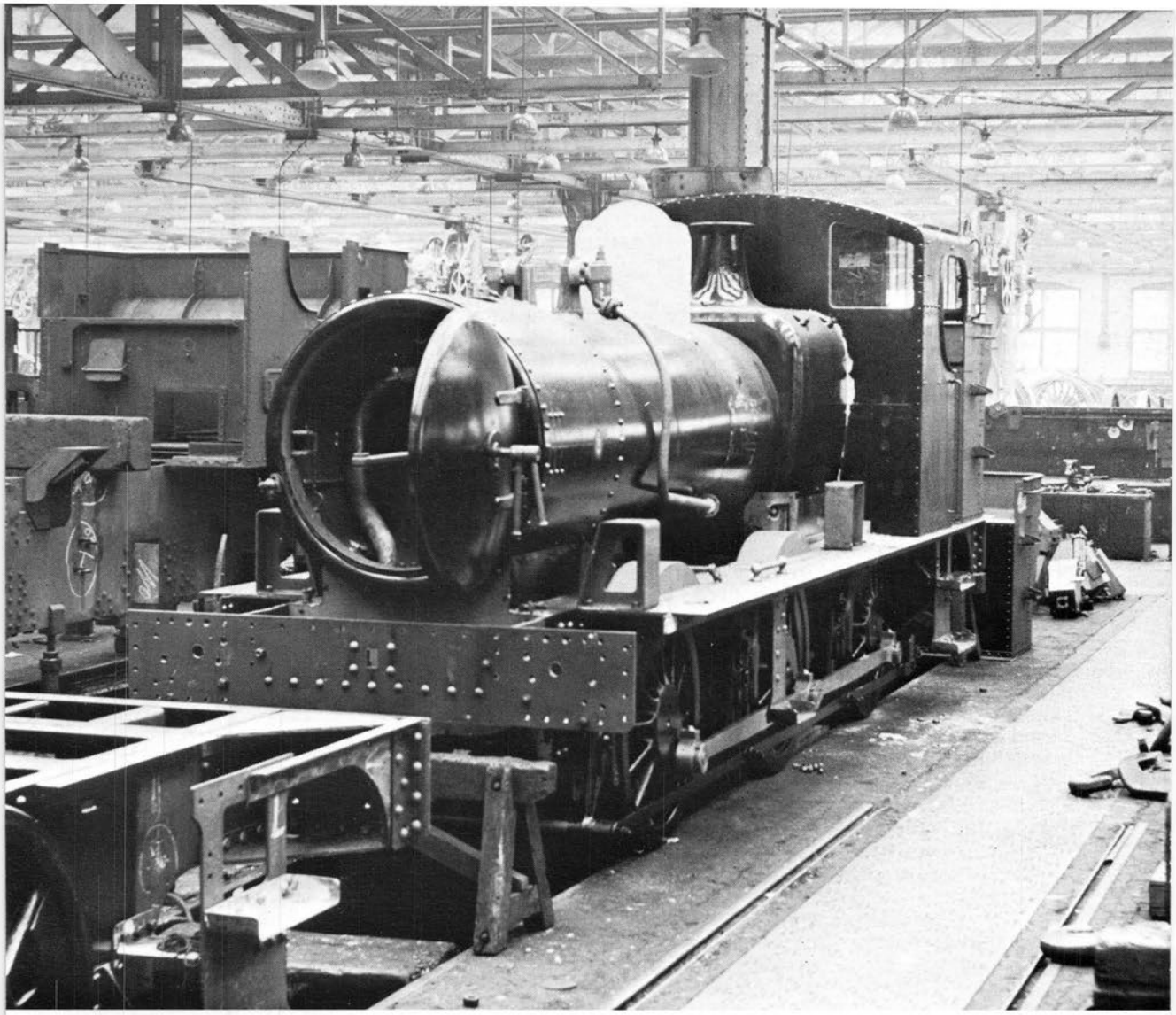
Above: The 1600 class pannier tanks were a modernised version of the 2021 class of Wolverhampton saddle tanks, dating back some 70 years. The same wheel diameter, of 4ft 1½in, was used. They had standard No 16 boilers, with top feed, and a boiler pressure of 165lb. No 1608 was photographed on shed, at Exeter, in May 1961. Although the entire class was built under BR auspices, they were a pure GWR design in every respect./*K. R. Pirt*

Below: 1600 class 0-6-0PT No 1622 makes a spirited start from the goods yard at Taplow with a short engineers p.w. train, on 6 February 1964. The overall weight was kept down to a minimum to allow a wide route availability, and a low axle load (less than 14tons on any axle) allowed them over former GWR 'uncoloured' lines./*Gerald T. Robinson*





1629



Above left: Working bunker-first, 0-6-0PT No 1605 was photographed on the Dursley Branch on 20 June 1961; approaching Workman's Mill Siding, between Coaley Junction and Cam. The passenger carriage attached to the rear of the train was being returned empty to Dursley in readiness for the 4.15pm working. No 1605 was first sent to the Dursley-Coaley branch in the autumn of 1957, to replace the ex-Midland Railway 0-6-0T formerly used. Another member of the class was sent even further afield, in February 1957, when No 1646 was transferred to the Scottish Region, for use on the Dornoch Branch. This engine was later joined by sister engine No 1649, and both remained in Scotland until withdrawal, latterly working as station pilots at Dingwall when the Dornoch branch was closed./*B. J. Ashworth*

Below left: Spark-arresting chimneys were fitted to Nos 1623/9/61, and No 1629 is illustrated with this ugly appendage, on Worcester shed, on 31 March 1957. The large chimney emphasises the low overall height of the cab and other boiler mountings; only two footsteps were considered necessary on the bunker side. The bunker capacity was 2½tons of coal and the water capacity was a modest 875gal./*E. J. Dew*

Above: 1600 class 0-6-0PT No 1660, under construction at Swindon works on 13 February 1955. By this time large numbers of diesel shunters were being delivered and these small pannier tanks were the final steam shunting engines built for use on BR. Layout of the top feed, and the supports for the pannier tanks clearly illustrated. In the foreground can be seen the bunker end framing of No 1661 in course of construction. /*Brian E. Morrison*

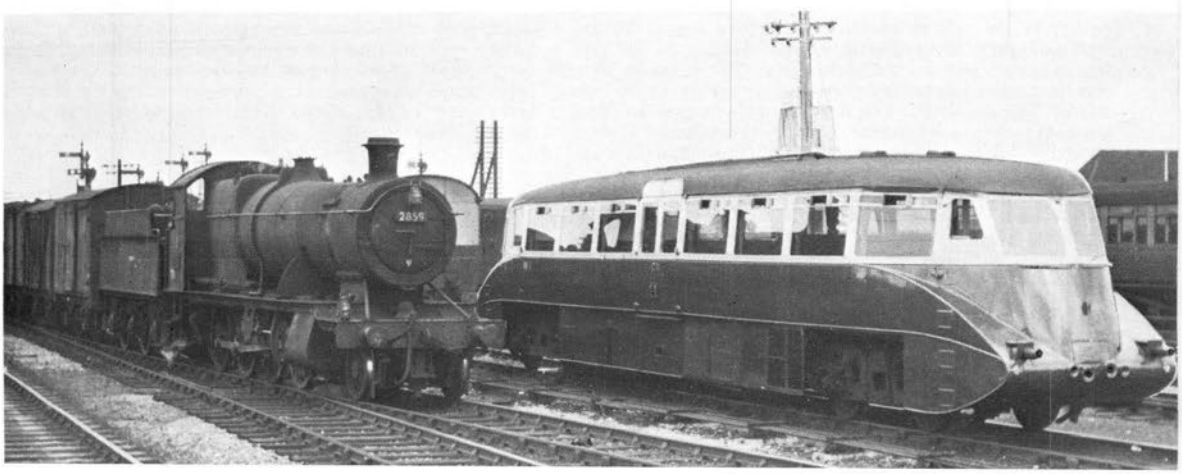
Appendix 1

Diesel Railcars & Gas Turbine Locomotives.

Although it will always be remembered, first and foremost, as a steam railway, the Great Western was very forward-looking in many respects, and its development of railcars for branch line and light main line duties was outstanding. Churchward had developed the steam railmotors, and auto-train trailers and had experimented with a petrol-electric railcar, No 100, in 1911. Collett produced new standard tank engines for the steam auto-trains, but he quickly recognised the potential of the lightweight AEC streamlined railcar that was placed in trial service between Paddington, Reading and Oxford, in February 1934, despite the fact that this prototype car was badly under-powered. In collaboration with the Associated Equipment Co, the design was improved and developed for GWR needs, and a batch of 20 produced between 1940-42 was built at Swindon, whereas previous cars were all contractor built. War prevented any further expansion of the fleet, but the majority of GWR railcars survived in service until replaced by BR diesel multiple-units, whose design owed a great deal to the work done by Collett in pre-war days.

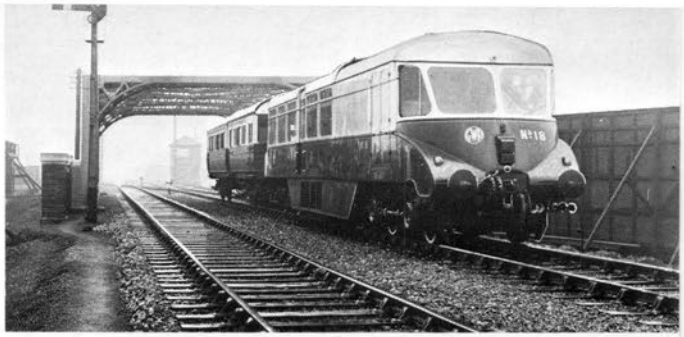
The post-war venture into gas turbine traction was, at the time, almost revolutionary and represented a greater step into the unknown than that being taken by the LMS and SR, at the same time, when they announced their intention to build prototype diesel-electric locomotives for main line use. Hawksworth and the GWR General Manager, Sir James Milne, inspected the Swiss gas turbine prototype and ordered a similar locomotive which was to be capable of working crack trains such as the 'Cornish Riviera Express'. A second engine was subsequently ordered from the British firm of Metropolitan-Vickers, which could operate on lower grade fuel. In retrospect, the venture into gas turbine locomotion may have been motivated by its prestige and publicity value, to some degree, but it was a bold attempt to move beyond steam, on the railway which had led the country in steam locomotive development for the first 25 years of this century. The gas turbines had many teething troubles to begin with, but both settled down to some excellent running in due course. The main objection was the low thermal efficiency, no better than a steam engine, due to the fact that almost as much fuel was consumed when stationary with the engine idling, or when running at reduced speed and power, as when exerted to full load, and it was recognised that the diesel locomotive was at a distinct advantage from this point of view, although more costly to maintain.

Below: The first diesel mechanical railcar, No 1, was built by the Associated Equipment Co. (AEC) of Southall, with bodywork by Park Royal Coachworks Ltd, and entered trial service on the GWR, in the Reading area, in December 1933. A single 121bhp AEC-Ricardo diesel engine was fitted, and the car proved to be under-powered. The design was a self-contained single unit (cabs at both ends) and had a very streamlined exterior with the sides carried down to conceal the bogies and the underfloor engine. A centre entrance vestibule (with double sliding doors) led to two passenger saloons with two and three aside seating separated by an off-centre gangway; seating was for 69 people. The next three railcars, Nos 2-4, were designed for express passenger service with maximum speed of some 75-80mph (compared to 60mph for No 1) and they had two 121bhp engines each, a buffet car section and two lavatories. Seating was for 44 people, plus a luggage compartment. Pioneer car No 1 is seen here in BR red and cream livery, as No W1, at Reading on 24 July 1950, with portions of valance removed to expose the bogies. 2800 class No 2859 is seen passing with an up freight. */R. E. Vincent*

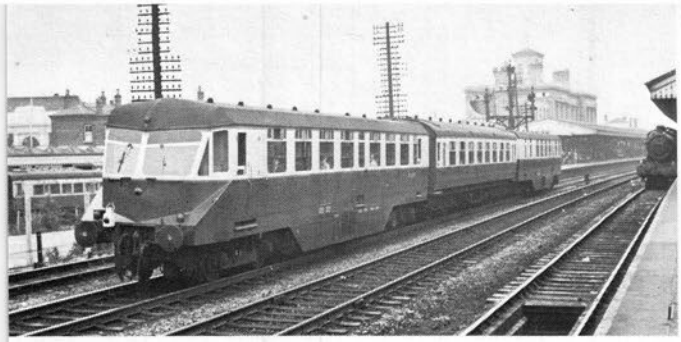


Above: Railcars Nos 5 to 16 were built by the Gloucester Railway Carriage & Wagon Co. with twin AEC-Ricardo engines, in 1935-36. They had the same streamlined appearance as the first cars, and had sliding doors. Nos 10-12 had a small lavatory compartment. Nos 1-16 had self-contained vacuum brake, i.e. no hoses at ends of vehicle, and special buffers; also concealed drawgear for emergency towage. This photograph shows railcar No 6 when new, in fully lined chocolate and cream livery and with small GWR monogram on centre door panel. Note that the streamlined valance concealed the bogies; later this was removed from various portions, for easier maintenance (see preceding illustration.) Car No 17 was specially designed for London area parcels traffic, with three sets of sliding doors and no passenger accommodation. The car shown here, together with No 11, was sent on loan to the LNER for a period in 1944 in the Newcastle area./*British Rail WR*

Above right: The eighteenth railcar delivered, No 18 (see also page 14) was designed to haul a tail load of up to 60tons, and was fitted with standard buffers and drawgear, hose couplings for vacuum brake and steam heating, and controls to enable the car to be driven from a driving trailer. No 18 was a double-ended single unit, with 49 seats and large luggage compartment, and had two engines of 121bhp. The lower portion of the bodywork was of revised design, with the valance raised to clear the bogies, and the cab windows were larger than on Nos 1-17, without the louvres placed above. No 18 is seen here, when new, hauling an auto-trailer, in February 1937./*Ian Allan Library*



Below: Following experience with No 18, a further batch of 20 railcars was authorised, with AEC engines, but with bodies and underframes, etc., built at Swindon. These had standard buffers and drawgear, modified brakes and a more angular appearance. The first 15 of the batch were intended for branch line and subsidiary services, and to haul a tail load of up to 60tons. No 34 was a parcels car, similar to No 17, but featuring the angular body contour. Nos 35-38 were designed as two pairs of twin-units. Two of the single unit cars, Nos 19 and 20 were given dual-range gearboxes which enabled them to operate to main line schedules at up to 60mph whereas the other cars had a maximum speed of 40mph. The interior layout was a central gangway with groups of four seats on either side. In BR red and cream livery, No W21W was photographed at Monmouth (Troy) station on the 11.50am for Chepstow on 16 June 1962. In the background, two other trains share the same platform, with 6400 class 0-6-0PT on the 12 noon to Pontypool and 1400 class 0-4-2T No 1455 on the 12.50pm for Ross. This was a regular sight at this interchange station./*N. E. Mitchell*



Above: Twin-unit railcars, with No W38W nearest the camera and with a standard corridor carriage between them, photographed approaching Reading with the 7.45am Slough-Newbury train on 2 August 1957. Railcars Nos 36 and 38 had a small buffet counter, and Nos 35 and 37 had lavatory accommodation. Top speed was 70mph. The railcar at the far end in this picture was W23W, originally a single unit, which was rebuilt in 1954 as a twin-unit car with one driving end and one vestibule end, to replace W37W damaged by fire in 1947 and stored out of use until scrapped in 1949. Prior to this, double ended single-unit cars, of trailer-hauling capacity, were used temporarily at one end of a three-coach formation. Nos 35-38 were built in 1941-42 and ran until 1957 (Nos 35/6) and 1962 (No 38), apart from the earlier withdrawal of No 37. Final livery was BR railcar green. Three diesel railcars have been preserved, these are Nos 4, 20 and 22, all of single-unit type./*R. A. Panting*

Above right: The GWR ordered its first gas turbine locomotive from the Brown-Boveri firm in Switzerland, in 1946, after seeing the original engine built by that firm in 1941. No 18000 ran a few trials in Switzerland before being delivered to the Western Region, via Harwich, in February 1950; further trials ensued before the engine was taken into BR stock the following May. With mechanical parts built by the Swiss Locomotive Company, No 18000 had the same route availability as the 'King' class, and had a maximum speed of 90mph. Top tractive effort was developed when starting a train, and this was 31 500lb at speeds up to 21mph. The centre axle of each bogie was not powered, making the locomotive an A1A-A1A type. Because the engine was delivered after nationalisation, it carried the black and silver livery scheme when new, but later it was repainted in Brunswick green, with red and white lining. No 18000 ran on the Paddington-Bristol main line for some ten years (with lengthy periods for repairs) and was withdrawn in December 1960. It then passed into the hands of the International Union of Railways, and was returned to Switzerland, where it has been used since as a Research Adhesion Test locomotive, and was still in existence at the time of writing. No 18000 was photographed leaving Chippenham with the 12 noon Bristol-Paddington train on 3 May 1951./*G. J. Jefferson*

Below: The second gas turbine locomotive was No 18100, built by Metropolitan-Vickers Electrical Co., and delivered to Swindon in December 1951. This modern looking machine was a Co-Co, with all the axles powered, and had a total weight in working order of 129tons 10cwt. Maximum speed was 90mph and the maximum tractive effort was 60 000lb, making it the most powerful passenger locomotive on BR when new. No 18100 was finished in black and silver livery, and ran trials on the Paddington-Bristol main line where it put-up some excellent performances. Nevertheless, it was withdrawn from stock in January 1958 and converted into an electric locomotive, No E2001, for crew-training purposes on the LMR main line, after which it lay out of use for a period, before being scrapped as of no further use./*Ian Allan Library*

Appendix 2

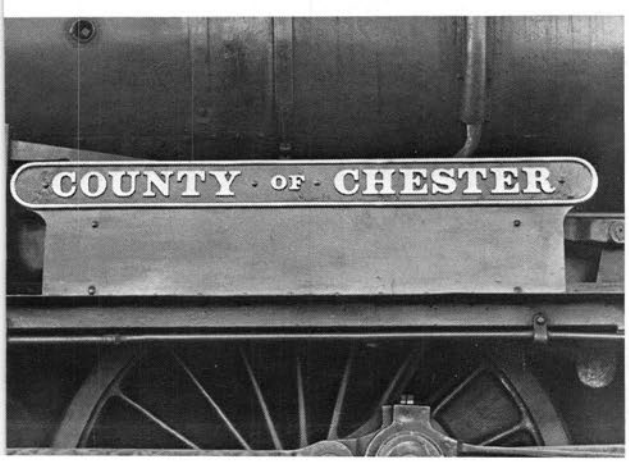
Named Locomotives.

Listing all named Collett & Hawksworth standard locomotives. Names and numbers in italics denote that the locomotive concerned was built after nationalisation; from 1948 onwards.

4-6-0 1000 class Mixed-Traffic Engines Hawksworth 'County' (see page 98)

1000 County of Middlesex
1001 County of Bucks
1002 County of Berks
1003 County of Wilts
1004 County of Somerset
1005 County of Devon
1006 County of Cornwall
1007 County of Brecknock
1008 County of Cardigan
1009 County of Carmarthen
1010 County of Caernarvon (a)
1011 County of Chester
1012 County of Denbigh
1013 County of Dorset
1014 County of Glamorgan
1015 County of Gloucester
1016 County of Hants
1017 County of Hereford
1018 County of Leicester
1019 County of Merioneth
1020 County of Monmouth

Below: Right-hand nameplate on Hawksworth 'County' class 4-6-0 No 1011 *County of Chester,* photographed at Swindon on 20 September 1964. The right-hand plate was supported on a backplate, whereas the left-hand plate was attached directly to the driving wheel splasher./*Brian Stephenson*



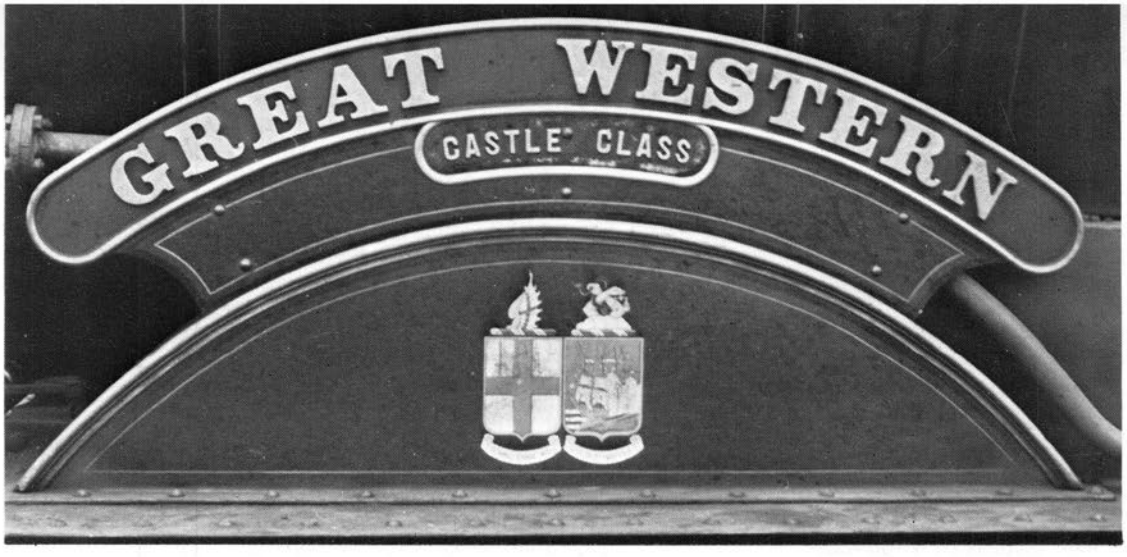
1021 County of Montgomery
1022 County of Northampton
1023 County of Oxford
1024 County of Pembroke
1025 County of Radnor
1026 County of Salop
1027 County of Stafford
1028 County of Warwick
1029 County of Worcester

(a) Spelling was Carnarvon *until November 1951. Nos 1000-1018 were delivered to traffic without names, which were added between 1946-48.*

4-6-0 4073 class Express Passenger Engines Collett 'Castle' (see page 18)

** Denotes engines fitted with double chimneys, 1956 onwards.*

100 A1 Lloyds (a)
111 Viscount Churchill
4000 North Star
4009 Shooting Star (a)
4016 The Somerset Light Infantry (Prince Albert's) (b)
4032 Queen Alexandra
4037 The South Wales Borderers (c)
4073 Caerphilly Castle
*4074 Caldicot Castle
4075 Cardiff Castle
4076 Carmarthen Castle
4077 Chepstow Castle
4078 Pembroke Castle
4079 Pendennis Castle
*4080 Powderham Castle
4081 Warwick Castle
4082 Windsor Castle (d)
4083 Abbotsbury Castle
4084 Aberystwyth Castle
4085 Berkeley Castle
4086 Builth Castle
*4087 Cardigan Castle
*4088 Dartmouth Castle
4089 Donnington Castle
*4090 Dorchester Castle
4091 Dudley Castle
4092 Dunraven Castle
*4093 Dunster Castle
4094 Dynevor Castle
4095 Harlech Castle
4096 Highclere Castle
*4097 Kenilworth Castle
4098 Kidwelly Castle
4099 Kilgerran Castle
5000 Launceston Castle
*5001 Llandovery Castle
5002 Ludlow Castle



Above: Typical 'Castle' class nameplate, complete with smaller plate displaying the class name, on No 7007 *Great Western,* photographed at Oxford on 2 August 1962. The GWR coat of arms was a special feature of this engine. This picture shows the normal layout of GWR engine nameplates during Collett's time, with the nameplate separated from the splasher by a distance piece./*R. A. Panting*

5003 Lulworth Castle
5004 Llanstephan Castle
5005 Manorbier Castle
5006 Tregenna Castle
5007 Rougemont Castle
*5008 Raglan Castle
5009 Shrewsbury Castle
5010 Restormel Castle
5011 Tintagel Castle
5012 Berry Pomeroy Castle
5013 Abergavenny Castle
5014 Goodrich Castle
5015 Kingswear Castle
*5016 Montgomery Castle
5017 St Donats Castle (i)
5018 St Mawes Castle
*5019 Treago Castle
5020 Trematon Castle
5021 Whittington Castle
*5022 Wigmore Castle
5023 Brecon Castle
5024 Carew Castle
5025 Chirk Castle
*5026 Criccieth Castle
*5027 Farleigh Castle
5028 Llantilio Castle
5029 Nunney Castle
5030 Shirburn Castle
*5031 Totnes Castle
*5032 Usk Castle
*5033 Broughton Castle
*5034 Corfe Castle
5035 Coity Castle
*5036 Lyonshall Castle
5037 Monmouth Castle
5038 Morlais Castle
5039 Rhuddlan Castle
5040 Stokesay Castle
5041 Tiverton Castle
5042 Winchester Castle
*5043 Earl of Mount Edgcumbe (e)
5044 Earl of Dunraven (e)
5045 Earl of Dudley (e)
5046 Earl Cawdor (e)
5047 Earl of Dartmouth (e)
5048 Earl of Devon (e)
*5049 Earl of Plymouth (e)
5050 Earl of St Germans (e)
5051 Earl Bathurst (e)
5052 Earl of Radnor (e)
5053 Earl Cairns (e)
5054 Earl of Ducie (e)
5055 Earl of Eldon (e)
*5056 Earl of Powis (e)
*5057 Earl Waldegrave (e)
5058 Earl of Clancarty (e)
5059 Earl St Aldwyn (e)
*5060 Earl of Berkeley (e)
*5061 Earl of Birkenhead (e)
5062 Earl of Shaftesbury (e)
5063 Earl Baldwin (e)
*5064 Bishop's Castle (e)
5065 Newport Castle (e)
*5066 Wardour Castle (j)
5067 St Fagans Castle
*5068 Beverston Castle
*5069 Isambard Kingdom Brunel
5070 Sir Daniel Gooch
*5071 Spitfire (f)

5072 Hurricane (f)
*5073 Blenheim (f)
*5074 Hampden (f)
5075 Wellington (f)
5076 Gladiator (f)
5077 Fairey Battle (f)
*5078 Beaufort (f)
5079 Lysander (f)
5080 Defiant (f)
5081 Lockheed Hudson (f)
5082 Swordfish (f)
5083 Bath Abbey
*5084 Reading Abbey
5085 Evesham Abbey
5086 Viscount Horne
5087 Tintern Abbey
*5088 Llanthony Abbey
5089 Westminster Abbey
5090 Neath Abbey
5091 Cleeve Abbey
*5092 Tresco Abbey
5093 Upton Castle
*5094 Tretower Castle
*5095 Barbury Castle
5096 Bridgwater Castle
*5097 Sarum Castle

Below: Non-standard nameplate on 'Castle' class 4-6-0 No 5017 *The Gloucestershire Regiment 28th 61st,* photographed in ex-works condition at Swindon on 26 May 1964. Note that the brass beading of the outer edge is carried on down to the beading of the splasher, also the regimental badge on the splasher itself. No 'Castle Class' plate carried, and no distance piece./*British Rail WR*

*5098 Clifford Castle
5099 Compton Castle
7000 Viscount Portal
*7001 Sir James Milne (g)
*7002 Devizes Castle
*7003 Elmley Castle
*7004 Eastnor Castle
7005 Lamphey Castle (k)
*7006 Lydford Castle
*7007 Great Western (h)
*7008 *Swansea Castle*
7009 *Athelney Castle*
*7010 *Avondale Castle*
7011 *Banbury Castle*
7012 *Barry Castle*
*7013 *Bristol Castle (d)*
*7014 *Caerhays Castle*
*7015 *Carn Brea Castle*
7016 *Chester Castle*
7017 *G. J. Churchward*
*7018 *Drysllwyn Castle*
*7019 *Fowey Castle*
*7020 *Gloucester Castle*
*7021 *Haverfordwest Castle*
*7022 *Hereford Castle*
*7023 *Penrice Castle*
*7024 *Powis Castle*
7025 *Sudeley Castle*
7026 *Tenby Castle*
7027 *Thornbury Castle*
*7028 *Cadbury Castle*
*7029 *Clun Castle*
*7030 *Cranbrook Castle*
7031 *Cromwell's Castle*
*7032 *Denbigh Castle*
*7033 *Hartlebury Castle*
*7034 *Ince Castle*
*7035 *Ogmore Castle*
*7036 *Taunton Castle*
7037 *Swindon*

(a) No 4009 was renumbered A1 100 and renamed Lloyds *in 1936.*
(b) No 4016 was originally named Knight of the Golden Fleece *(until 1938).*
(c) No 4037 was originally named Queen Philippa *(until 1937).*
(d) Nos 4082 and 7013 exchanged name and numberplates in February 1952. The change was permanent (see page 25).
(e) In 1937 it was decided to transfer the 'Earl' class names originally allotted to the 3200 class 4-4-0s to 'Castle' class 4-6-0s Nos 5043-5062; the original names carried by the 'Castle' class engines affected were as follows:
5043 Barbury Castle

5044 Beverston Castle
5045 Bridgwater Castle
5046 Clifford Castle
5047 Compton Castle
5048 Cranbrook Castle
5049 Denbigh Castle
5050 Devizes Castle
5051 Drysllwyn Castle
5052 Eastnor Castle
5053 Bishop's Castle
5054 Lamphey Castle
5055 Lydford Castle
5056 Ogmore Castle
5057 Penrice Castle
5058 Newport Castle
5059 Powis Castle
5060 Sarum Castle
5061 Sudeley Castle
5062 Tenby Castle
5063 Thornbury Castle
5064 Tretower Castle

(f) In 1940-41 the names of 'Castle' class 4-6-0s Nos 5071-5082 were replaced by the names of World War II aircraft, associated with the Battle of Britain. The original names were as follows:

5071 Clifford Castle
5072 Compton Castle
5073 Cranbrook Castle
5074 Denbigh Castle
5075 Devizes Castle
5076 Drysllwyn Castle
5077 Eastmoor Castle
5078 Lamphey Castle
5079 Lydford Castle
5080 Ogmore Castle
5081 Penrice Castle
5082 Powis Castle

(g) No 7001 was named Denbigh Castle *until February 1948.*

(h) No 7007 was named Ogmore Castle *until January 1948. (Both Nos 7001/7, were renamed to commemorate the end of the Great Western régime, when the railway was nationalised.)*

(i) No 5017 was renamed the Gloucestershire Regiment 28/61 *in April 1954.*

(j) No 5066 was renamed Sir Felix Pole *in April 1956.*

(k) No 7005 was renamed Sir Edward Elgar *in August 1957.*

4-6-0 4900 class Mixed Traffic Engines Collett 'Hall' (see page 30).

4900 (2925) Saint Martin
4901 Adderley Hall
4902 Aldenham Hall
4903 Ashley Hall
4904 Binnegar Hall
4905 Barton Hall
4906 Bradfield Hall
4907 (3903) Broughton Hall
4908 Broome Hall
4909 Blakesley Hall
4910 Blaisdon Hall
4911 Bowden Hall (a)
4912 Berrington Hall
4913 Baglan Hall
4914 Cranmore Hall
4915 Condover Hall
4916 Crumlin Hall
4917 Crosswood Hall
4918 Dartington Hall
4919 Donnington Hall
4920 Dumbleton Hall
4921 Eaton Hall
4922 Enville Hall
4923 Evenley Hall
4924 Eydon Hall
4925 Eynsham Hall
4926 Fairleigh Hall
4927 Farnborough Hall
4928 Gatacre Hall
4929 Goytrey Hall
4930 Hagley Hall
4931 Hanbury Hall
4932 Hatherton Hall
4933 Himley Hall
4934 Hindlip Hall
4935 Ketley Hall
4936 Kinlet Hall
4937 Lanelay Hall
4938 Liddington Hall
4939 Littleton Hall
4940 Ludford Hall
4941 Llangedwyn Hall
4942 Maindy Hall
4943 Marrington Hall
4944 Middleton Hall
4945 Milligan Hall
4946 Moseley Hall
4947 Nanhoran Hall
4948 (3902) Northwick Hall
4949 Packwood Hall
4950 Patshull Hall
4951 Pendeford Hall
4952 Peplow Hall
4953 Pitchford Hall
4954 Plaish Hall
4955 Plaspower Hall
4956 Plowden Hall
4957 Postlip Hall

4958 Priory Hall
4959 Purley Hall
4960 Pyle Hall
4961 Pyrland Hall
4962 Ragley Hall
4963 Rignall Hall
4964 Rodwell Hall
4965 Rood Ashton Hall
4966 Shakenhurst Hall
4967 Shirenewton Hall
4968 (3900) Shotton Hall
4969 Shrugborough Hall
4970 Sketty Hall
4971 (3901) Stanway Hall
4972 (3904) Saint Brides Hall (b)
4973 Sweeney Hall
4974 Talgarth Hall
4975 Umberslade Hall
4976 Warfield Hall
4977 Watcombe Hall
4978 Westwood Hall
4979 Wootton Hall
4980 Wrottesley Hall
4981 Abberley Hall
4982 Acton Hall
4983 Albert Hall
4984 Albrighton Hall
4985 Allesley Hall (c)
4986 Aston Hall
4987 Brockley Hall
4988 Bulwell Hall
4989 Cherwell Hall
4990 Clifton Hall
4991 Cobham Hall
4992 Crosby Hall
4993 Dalton Hall
4994 Downton Hall
4995 Easton Hall
4996 Eden Hall
4997 Elton Hall
4998 Eyton Hall
4999 Gopsal Hall

5900 Hinderton Hall
5901 Hazel Hall
5902 Howick Hall
5903 Keele Hall
5904 Kelham Hall
5905 Knowsley Hall
5906 Lawton Hall
5907 Marble Hall
5908 Moreton Hall
5909 Newton Hall
5910 Park Hall
5911 Preston Hall
5912 Queen's Hall (d)
5913 Rushton Hall
5914 Ripon Hall
5915 Trentham Hall
5916 Trinity Hall
5917 Westminster Hall
5918 Walton Hall
5919 Worsley Hall
5920 Wycliffe Hall
5921 Bingley Hall
5922 Caxton Hall
5923 Colston Hall
5924 Dinton Hall
5925 Eastcote Hall
5926 Grotrian Hall
5927 Guild Hall
5928 Haddon Hall
5929 Hanham Hall
5930 Hannington Hall
5931 Hatherley Hall
5932 Haydon Hall
5933 Kingsway Hall
5934 Kneller Hall
5935 Norton Hall
5936 Oakley Hall
5937 Stanford Hall
5938 Stanley Hall
5939 Tangley Hall
5940 Whitbourne Hall
5941 Campion Hall
5942 Doldowlod Hall
5943 Elmdon Hall
5944 Ickenham Hall
5945 Leckhampton Hall
5946 Marwell Hall
5947 Saint Benet's Hall (d)
5948 Siddington Hall
5949 Trematon Hall
5950 Wardley Hall
5951 Clyffe Hall
5952 Cogan Hall
5953 Dunley Hall
5954 Faendre Hall
5955 (3950) Garth Hall
5956 Horsley Hall
5957 Hutton Hall
5958 Knolton Hall
5959 Mawley Hall
5960 Saint Edmund Hall
5961 Toynbee Hall
5962 Wantage Hall
5963 Wimpole Hall
5964 Wolseley Hall
5965 Woollas Hall
5966 Ashford Hall
5967 Bickmarsh Hall
5968 Cory Hall

5969 Honington Hall
5970 Hengrave Hall
5971 Merevale Hall
5972 Olton Hall
5973 Rolleston Hall
5974 Wallsworth Hall
5975 Winslow Hall
5976 (3951) Ashwicke Hall
5977 Beckford Hall
5978 Bodinnick Hall
5979 Cruckton Hall
5980 Dingley Hall
5981 Frensham Hall
5982 Harrington Hall
5983 Henley Hall
5984 Linden Hall
5985 Mostyn Hall
5986 (3954) Arbury Hall
5987 Brocket Hall
5988 Bostock Hall
5989 Cransley Hall
5990 Dorford Hall
5991 Gresham Hall
5992 Horton Hall
5993 Kirby Hall
5994 Roydon Hall
5995 Wick Hall
5996 Mytton Hall
5997 Sparkford Hall
5998 Trevor Hall
5999 Wollaton Hall

6900 Abney Hall
6901 Arley Hall
6902 Butlers Hall
6903 Belmont Hall
6904 Charfield Hall
6905 Claughton Hall
6906 Chicheley Hall
6907 Davenham Hall
6908 Downham Hall
6909 Frewin Hall
6910 Gossington Hall
6911 Holker Hall
6912 Helmster Hall
6913 Levens Hall
6914 Langton Hall
6915 Mursley Hall
6916 Misterton Hall
6917 Oldlands Hall
6918 Sandon Hall
6919 Tylney Hall
6920 Barningham Hall
6921 Borwick Hall
6922 Burton Hall
6923 Croxteth Hall
6924 Grantley Hall
6925 Hackness Hall
6926 Holkham Hall
6927 Lilford Hall
6928 Underley Hall
6929 Whorlton Hall
6930 Aldersey Hall
6931 Aldborough Hall
6932 Burwarton Hall
6933 Birtles Hall
6934 Beachamwell Hall
6935 Browsholme Hall
6936 Breccles Hall
6937 Conyngham Hall
6938 Corndean Hall
6939 Calveley Hall
6940 Didlington Hall
6941 Fillongley Hall
6942 Eshton Hall
6943 Farnley Hall
6944 Fledborough Hall
6945 Glasfryn Hall
6946 Heatherden Hall
6947 Helmingham Hall
6948 Holbrooke Hall
6949 (3955) Haberfield Hall
6950 Kingsthorpe Hall
6951 Impney Hall
6952 Kimberley Hall
6953 (3953) Leighton Hall
6954 Lotherton Hall
6955 Lydcott Hall
6956 Mottram Hall
6957 (3952) Norcliffe Hall
6958 Oxburgh Hall

(a) No 4911 Bowden Hall *was scrapped after severe air raid damage in 1941.*
(b) No 4972 was at first named St Brides Hall.
(c) No 4985 was at first named Allersley Hall *(until 1931).*
(d) Nos 5912/47 was at first Queens Hall *and* Saint Benets Hall *respectively (until 1935).*
Nos 6916-6958, built during World War II, did not carry names until 1946-47.
Engines shown renumbered in the 3900 series were converted to oil-burning in 1946-47.

4-6-0 6000 class Express Passenger Engines Collett 'King' (see page 42)

6000 King George V
6001 King Edward VII
6002 King William IV
6003 King George IV
6004 King George III
6005 King George II

6006 King George I
6007 King William III (a)
6008 King James II
6009 King Charles II
6010 King Charles I
6011 King James I
6012 King Edward VI
6013 King Henry VIII
6014 King Henry VII
6015 King Richard III
6016 King Edward V
6017 King Edward IV
6018 King Henry VI
6019 King Henry V
6020 King Henry IV
6021 King Richard II
6022 King Edward III
6023 King Edward II
6024 King Edward I
6025 King Henry III
6026 King John
6027 King Richard I
6028 King George VI (b)
6029 King Edward VIII (c)

(a) Damaged in the Shrivenham disaster of 15 January 1936 and renewed the same year (using parts from the condemned engine).
(b) No 6028 was King Henry II *until January 1937.*
(c) No 6029 was King Stephen *until May 1937.*

4-6-0 6800 class Mixed-Traffic Engines Collett 'Grange' (see page 84)
6800 Arlington Grange
6801 Aylburton Grange
6802 Bampton Grange
6803 Bucklebury Grange
6804 Brockington Grange
6805 Broughton Grange
6806 Blackwell Grange
6807 Birchwood Grange
6808 Beenham Grange
6809 Burghclere Grange
6810 Blakemere Grange
6811 Cranbourne Grange
6812 Chesford Grange
6813 Eastbury Grange
6814 Enborne Grange
6815 Frilford Grange
6816 Frankton Grange
6817 Gwenddwr Grange
6818 Hardwick Grange
6819 Highnam Grange
6820 Kingstone Grange
6821 Leaton Grange
6822 Manton Grange
6823 Oakley Grange
6824 Ashley Grange
6825 Llanvair Grange
6826 Nannerth Grange
6827 Llanfrechfa Grange
6828 Trellech Grange
6829 Burmington Grange
6830 Buckenhill Grange
6831 Bearley Grange
6832 Brockton Grange
6833 Calcot Grange
6834 Dummer Grange
6835 Eastham Grange
6836 Estevarney Grange
6837 Forthampton Grange
6838 Goodmoor Grange
6839 Hewell Grange
6840 Hazeley Grange
6841 Marlas Grange
6842 Nunhold Grange
6843 Poulton Grange
6844 Penhydd Grange
6845 Paviland Grange
6846 Ruckley Grange
6847 Tidmarsh Grange
6848 Toddington Grange
6849 Walton Grange
6850 Cleeve Grange
6851 Hurst Grange
6852 Headbourne Grange
6853 Morehampton Grange
6854 Roundhill Grange
6855 Saighton Grange
6856 Stowe Grange
6857 Tudor Grange
6858 Woolston Grange
6859 Yiewsley Grange
6860 Aberporth Grange
6861 Crynant Grange
6862 Derwent Grange
6863 Dolhywel Grange
6864 Dymock Grange
6865 Hopton Grange
6866 Morfa Grange
6867 Peterston Grange
6868 Penrhos Grange
6869 Resolven Grange
6870 Bodicote Grange
6871 Bourton Grange
6872 Crawley Grange
6873 Caradoc Grange
6874 Haughton Grange
6875 Hindford Grange
6876 Kingsland Grange
6877 Llanfair Grange

6878 Longford Grange
6879 Overton Grange

4-6-0 6959 class Mixed-Traffic Engines. Hawksworth 'Modified Hall' (see page 93)
6959 Peatling Hall
6960 Raveningham Hall
6961 Stedham Hall
6962 Soughton Hall
6963 Throwley Hall
6964 Thornbridge Hall
6965 Thirlestaine Hall
6966 Witchingham Hall
6967 Willesley Hall
6968 Woodcock Hall
6969 Wraysbury Hall
6970 Whaddon Hall
6971 Athelhampton Hall
6972 Beningbrough Hall
6973 Bricklehampton Hall
6974 Bryngwyn Hall
6975 Capesthorne Hall
6976 Graythwaite Hall
6977 Grundisburgh Hall
6978 Haroldstone Hall
6979 Helperly Hall
6980 Llanrumney Hall
6981 Marbury Hall
6982 Melmerby Hall
6983 Otterington Hall
6984 Owsden Hall
6985 Parwick Hall
6986 Rydal Hall
6987 Shervington Hall
6988 Swithland Hall
6989 Wightwick Hall
6990 Witherslack Hall
6991 Acton Burnell Hall
6992 Arborfield Hall
6993 Arthog Hall
6994 Baggrave Hall
6995 Benthall Hall
6996 Blackwell Hall
6997 Bryn-Ivor Hall
6998 Burton Agnes Hall
6999 Capel Dewi Hall
7900 Saint Peter's Hall
7901 Dodington Hall
7902 Eaton Mascot Hall
7903 Foremarke Hall
7904 Fountains Hall
7905 Fowey Hall
7906 Fron Hall
7907 Hart Hall
7908 Henshall Hall
7909 Heveningham Hall
7910 Hown Hall
7911 Lady Margaret Hall
7912 Little Linford Hall
7913 Little Wyrley Hall
7914 Lleweni Hall
7915 Mere Hall
7916 Mobberley Hall
7917 North Aston Hall
7918 Rhose Wood Hall
7919 Runter Hall
7920 Coney Hall
7921 Edstone Hall
7922 Salford Hall
7923 Speke Hall
7924 Thornycroft Hall
7925 Westol Hall
7926 Willey Hall
7927 Willington Hall
7928 Wolf Hall
7929 Wyke Hall
Nos 6959-6970 ran without nameplates during World War II. Names were fitted in the period 1946-48.

4-6-0 7800 class Mixed-Traffic Engines Collett 'Manor' (see page 88)
7800 Torquay Manor
7801 Anthony Manor
7802 Bradley Manor
7803 Barcote Manor
7804 Baydon Manor
7805 Broome Manor
7806 Cockington Manor
7807 Compton Manor
7808 Cookham Manor
7809 Childrey Manor
7810 Draycott Manor
7811 Dunley Manor
7812 Erlestoke Manor
7813 Freshford Manor
7814 Fringford Manor
7815 Fritwell Manor
7816 Frilsham Manor
7817 Garsington Manor
7818 Granville Manor
7819 Hinton Manor
7820 Dinmore Manor
7821 Ditcheat Manor
7822 Foxcote Manor
7823 Hook Norton Manor
7824 Iford Manor
7825 Lechlade Manor
7826 Longworth Manor
7827 Lydham Manor
7828 Odney Manor
7829 Ramsbury Manor

Appendix 3

Power Groups & Route Colours

The GWR classification, included in each Section heading in this book, was designed specifically to show the operating staff the power of the engine and its route availability, based on axle load. Seven power groups were defined and indicated by the letters A, B, C, D, E on the cabside, to show the capacity of an engine, or class, in relation to the work required of it. The axle load was defined by 'colouring' each class, and supplying running sheds with a coloured map of the railway system, which showed each route by the colour of permitted axle load, and prevented an engine of too great an axle load being sent over a route incapable of carrying it. Thus a 'red' engine could not work over a 'yellow' route, and so on. The colour was applied as a disc on the cab sides, and the power group letter was inset upon it. The power groups and route restriction colours were as follows:

Power Groups

Tractive effort Not Exceeding LBS.	*Group Letter*
16500	Ungrouped
18500	A
20500	B
25000	C
33000	D
38000	E
above 38000	Special

Route Restriction

Axle Load	*Route Colour*
Up to 14tons	Uncoloured
Up to 16tons	Yellow
Up to 17tons 12cwts.	Blue
Over 17tons 12cwts.	Red
King Class only	Double Red

Although, in BR days, the Western Region was included in the standard scheme for indicating power groups by numbers and letters, on the cabsides, i.e. 6P, 7F, 3MT, etc, (based upon former LMS practice) they continued to use their own scheme. In fact only a few WR engines, other than BR standard types, carried the BR notation, although the reverse applied, and former LMS and BR standard engines allocated to the Western actually carried the former GWR colour and power group discs, as well as the BR version.

Left: Standard GWR brass cabside numberplate, seen on No 5963 *Wimpole Hall*. The white X painted above the number denoted that the engine was permitted to take loads above those laid down in the working books. Above is the power group and route classification: D, Red./*British Rail*

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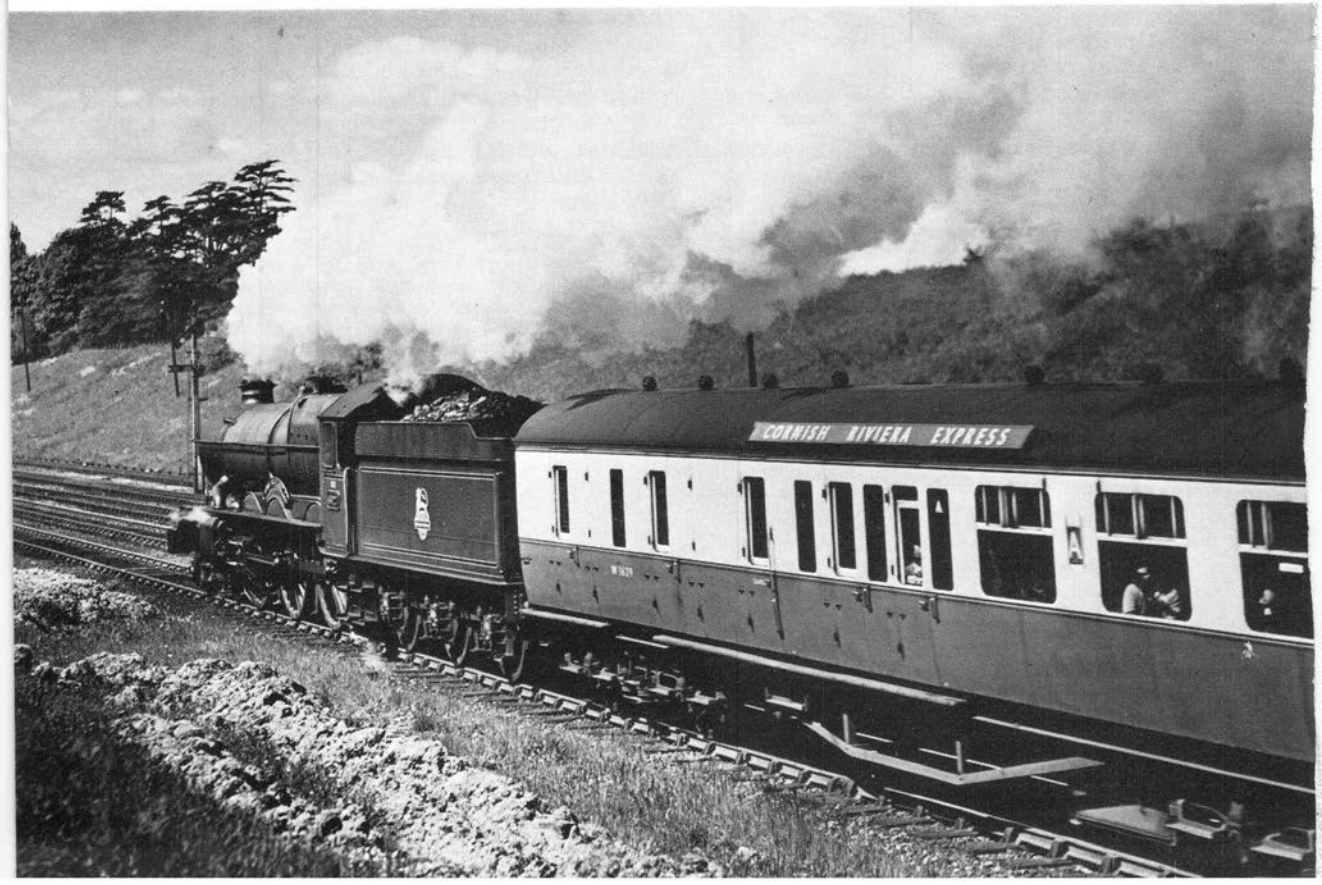
In series with this 'Pictorial History' of *Collett & Hawksworth Locomotives* are the following books by Brian Haresnape (Published by Ian Allan Ltd):

Stanier Locomotives
Fowler Locomotives
Churchward Locomotives
Maunsell Locomotives
Bulleid Locomotives
Ivatt & Riddles Locomotives

In preparation:
Gresley Locomotives

Below: The classic way to the West. A 'King' class 4-6-0, in BR blue livery, heads the down 'Cornish Riviera Express' through Twyford, circa 1949./*M. W. Earley*